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IN THE UNITED STATES DISTRICT COURT

FOR THE CENTRAL DISTRICT OF CALIFORNIA

UNITED STATES OF AMERICA, and STATE OF CALIFORNIA, on behalf of the State of California Department of Toxic Substances Control and the State of California Hazardous Substance Account, Plaintiffs, v. TEXACO INC., Defendant.	Civil No. CV 93-2990-JSL(SHx) CONSENT DECREE

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CONSENT DECREE

I. BACKGROUND

A. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606, 9607 and Section 7003 of the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 et seq (also known as the Resource Conservation and Recovery Act).

B. The United States in its complaint seeks, inter alia: (1) reimbursement of costs incurred by EPA and the Department of Justice for response actions at the Pacific Coast Pipeline Superfund Site in Fillmore, California, together with accrued interest; and (2) performance of studies and response work by Texaco at the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) ("NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of California (the "State") on April 15, 1992 of negotiations with potentially responsible parties regarding the implementation of the remedial design and remedial action for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Decree.

D. The State has joined the United States' complaint against Texaco in this Court as a co-plaintiff and is alleging that

Texaco is liable to the State under Section 107 of CERCLA, 42 U.S.C. 9607 and under Sections 25187 and 25358.3 of the California Health and Safety Code for: (1) reimbursement of costs that the State has incurred at the Pacific Coast Pipeline Site in Fillmore, California and (2) performance of studies and response work by Texaco at the Site.

E. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the relevant Federal natural resource trustees on May 27, 1992 of negotiations with potentially responsible parties regarding the release of hazardous substances that may have resulted in injury to the natural resources under Federal trusteeship and encouraged the trustee(s) to participate in the negotiation of this Consent Decree.

F. By entering into this Consent Decree, Texaco does not admit any liability to the Plaintiffs arising out of the transactions or occurrences alleged in the complaint and does not agree with the allegations in the complaint.

G. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on October 4, 1989, 54 Fed. Reg. 1015;

H. In response to a release or a substantial threat of a release of hazardous substances at or from the Site, Texaco, commenced on January 15, 1989, a Remedial Investigation and Feasibility Study ("RI/FS") for the Site pursuant to an Administrative Order on Consent for Remedial Investigation and Feasibility Study, EPA Docket No. 90-03 and 40 C.F.R. § 300.430.

I. Texaco completed a Remedial Investigation ("RI") Report in

March 1991, and Texaco completed a Feasibility Study ("FS") Report in February 1992.

J. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS and of the proposed plan for remedial action on February 24, 1992 in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Regional Administrator based the selection of the response action.

K. The decision by EPA on the remedial action to be implemented at the Site is embodied in a final Record of Decision ("ROD"), executed on March 31, 1992, on which the State has given its concurrence. The ROD includes a summary of EPA's responses to public comments received on the proposed remedy. Notice of the final plan was published in accordance with Section 117(b) of CERCLA.

L. Based on the information presently available to EPA and the State, EPA and the State believe that the Work will be properly and promptly conducted by Texaco if conducted in accordance with the requirements of this Consent Decree and its appendices.

M. Solely for the purposes of Section 113(j) of CERCLA, the Remedial Action selected by the ROD and the Work to be performed by Texaco shall constitute a response action taken or ordered by the President.

N. The Parties recognize, and the Court by entering this

Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and 42 U.S.C. §§ 9606, 9607, 9613(b) and 6973. This Court also has personal jurisdiction over Texaco. Solely for the purposes of this Consent Decree and the underlying complaint, Texaco waives all objections and defenses that it may have to jurisdiction of the Court or to venue in this District. Texaco shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and the State and upon Texaco and its successors and assigns. Any change in ownership or corporate status of Texaco including, but not limited to, any transfer of assets or real or personal property shall in no way alter Texaco's responsibilities under this Consent Decree.

3. Texaco shall provide a copy of this Consent Decree to each contractor hired to perform the Work (as defined below) required by this Consent Decree and to each person representing Texaco with respect to the Site or the Work and shall condition all

contracts entered into hereunder upon performance of the Work in conformity with the terms of this Consent Decree. Texaco or its contractors shall provide written notice of the Consent Decree to all subcontractors hired to perform any portion of the Work required by this Consent Decree. Texaco shall nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work contemplated herein in accordance with this Consent Decree. With regard to the activities undertaken pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual relationship with Texaco within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV. DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Consent Decree which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 et seq.

"Consent Decree" shall mean this Decree and all appendices attached hereto (listed in Section XXX). In the event of conflict between this Decree and any appendix, this Decree shall control.

"Day" shall mean a calendar day unless expressly stated to be

a working day. "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

"EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

"Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States and the State incur in reviewing or developing plans, reports and other items pursuant to this Consent Decree, verifying the Work, or otherwise implementing, overseeing, or enforcing this Consent Decree, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Sections VII, VIII, X (including, but not limited to, attorneys fees and the amount of just compensation), XVI, and Paragraph 83 of Section XXII. Future Response Costs shall also include all costs, including direct and indirect costs, paid by the United States and the State in connection with the Site between June 30, 1992 and the effective date of this Consent Decree except for those costs which Texaco has paid or will pay EPA pursuant to the Administrative Order on Consent for Remedial Investigation and Feasibility Study prior to the effective date of this Consent Decree.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605,

codified at 40 C.F.R. Part 300, including, but not limited to, any amendments thereto.

"Operation and Maintenance" or "O & M" shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the Operation and Maintenance Plan approved or developed by EPA pursuant to this Consent Decree and the Statement of Work (SOW).

"Paragraph" shall mean a portion of this Consent Decree identified by an arabic numeral or an upper case letter.

"Parties" shall mean the United States, the State of California, and Texaco.

"Past Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs and interest, that the United States and the State incurred and paid with regard to the Site prior to June 30, 1992, except for those costs which Texaco has paid or will pay EPA pursuant to the Administrative Order on Consent for Remedial Investigation and Feasibility Study prior to the effective date of the Consent Decree.

"Performance Standards" shall mean those cleanup standards, standards of control, and other substantive requirements, criteria or limitations set forth in the ROD and Section III of the SOW.

"Plaintiffs" shall mean the United States and the State of California.

"Preliminary Design Work Plan Summary" shall mean the summary of the Preliminary Design Work Plan approved by EPA pursuant to the Administrative Order on Consent for Remedial Investigation and Feasibility Study for the Pacific Coast Pipeline Site, U.S.

EPA Docket No. 90-03. The Preliminary Design Work Plan Summary is incorporated herein as Appendix C.

"RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 et seq. (also known as the Resource Conservation and Recovery Act).

"Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the Site signed on March 31, 1992, by the Regional Administrator, EPA Region IX, and all attachments thereto.

"Remedial Action" shall mean those activities, except for Operation and Maintenance, to be undertaken by Texaco to implement the final plans and specifications submitted by Texaco pursuant to the Preliminary Design Work Plan Summary and the Statement of Work and approved by EPA.

"Remedial Action Work Plan" shall mean the document submitted by Texaco pursuant to Paragraph 12.a of this Consent Decree and described more fully in Paragraph 12.b.

"Remedial Design" shall mean those activities to be undertaken by Texaco to develop the final plans and specifications for the Remedial Action pursuant to the Preliminary Design Work Plan Summary and the Statement of Work.

"Section" shall mean a portion of this Consent Decree identified by a roman numeral.

"Site" shall mean the Pacific Coast Pipeline Superfund site, encompassing approximately 20 acres, located at 67 East Telegraph Road in Fillmore, Ventura County, California and depicted generally on the map attached as Appendix D.

"State" shall mean the State of California, the California

Environmental Protection Agency and the Department of Toxic Substances Control.

"Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design, Remedial Action, and Operation and Maintenance at the Site, as set forth in Appendix B to this Consent Decree and any modifications made in accordance with this Consent Decree.

"Supervising Contractor" shall mean the principal contractor retained by Texaco to supervise and direct the implementation of the Work under this Consent Decree.

"Texaco" shall mean Texaco, Inc. and its subsidiary, Texaco Refining and Marketing, Inc., for purposes of this Consent Decree.

"United States" shall mean the United States of America.

"Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33), 42 U.S.C. § 9601(33); (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and (4) any "hazardous material" under California Hazardous Waste Control Law Section 25501.

"Work" shall mean all activities Texaco is required to perform under this Consent Decree, except those required by Section XXVI (Retention of Records).

V. GENERAL PROVISIONS

5. Objectives of the Parties

The objectives of the Parties in entering into this Consent Decree are to protect public health or welfare or the environment at the Site by the design and implementation of response actions

at the Site by Texaco and to reimburse response costs of the Plaintiffs.

6. Commitments by Texaco

Texaco shall finance and perform the Work in accordance with this Consent Decree and all plans, standards, specifications, and schedules set forth in or developed and approved under Section XII by EPA pursuant to this Consent Decree. Texaco shall also reimburse the United States and the State for Past Response Costs and Future Response Costs as provided in this Consent Decree.

7. Compliance With Applicable Law

All activities undertaken by Texaco pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Texaco must comply with all applicable or relevant and appropriate requirements of all federal and state environmental laws as set forth in the ROD and the SOW. The activities conducted pursuant to this Consent Decree, if approved by EPA, shall be considered to be consistent with the NCP.

8. Permits

a. As provided in Section 121(e) of CERCLA and §300.5 of the NCP, no permit shall be required for any portion of the Work conducted entirely on-site. Where any portion of the Work requires a federal or state permit or approval, Texaco shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. Texaco may seek relief under the provisions of Section XIX (Force Majeure) of this Consent Decree for any delay

in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit required for the Work.

c. This Consent Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

9. Notice of Obligations to Successors-in-Title

a. Within 30 days after the entry of this Consent Decree, Texaco shall record a certified copy of this Consent Decree with the Recorder's Office, Ventura County, State of California. Thereafter, until EPA issues a certificate of completion for the work pursuant to Paragraph 47 b., each deed, title, or other instrument conveying an interest in the property included in the Site shall contain a notice stating that the property is subject to this Consent Decree and shall reference the recorded location of the Consent Decree and any restrictions applicable to the property under this Consent Decree.

b. The obligations of Texaco with respect to the provision of access under Section X (Access) shall be binding upon all persons who subsequently acquire any such interest or portion thereof (hereinafter "Successors-in-Title"). Within 30 days after the entry of this Consent Decree, Texaco shall record at the Recorder's Office or other appropriate office where land ownership and transfer records are maintained for the property a notice of obligation to provide access under Section X (Access) and related covenants. Each subsequent instrument conveying an interest to any such property included in the Site shall reference the recorded location of such notice and covenants

applicable to the property.

c. Texaco and any Successor-in-Title shall, at least 30 days prior to the conveyance of any such interest, give written notice of this Consent Decree to the grantee and written notice to EPA and the State of the proposed conveyance, including the name and address of the grantee, and the date on which notice of the Consent Decree was given to the grantee. In the event of any such conveyance, Texaco's obligations under this Consent Decree, including its obligations to provide or secure access pursuant to Section X, shall continue to be met by Texaco. In addition, if the United States and the State approves, the grantee may perform some or all of the Work under this Consent Decree. In no event shall the conveyance of an interest in property that includes, or is a portion of, the Site release or otherwise affect the liability of Texaco to comply with the Consent Decree.

VI. PERFORMANCE OF THE WORK BY TEXACO

10. Selection of Supervising Contractor.

a. All aspects of the Work to be performed by Texaco pursuant to Sections VI (Performance of the Work by Texaco), VII (Additional Response Actions), VIII (U.S. EPA Periodic Review), and IX (Quality Assurance, Sampling and Data Analysis) of this Consent Decree shall be under the direction and supervision of the Supervising Contractor, the selection of which shall be subject to disapproval by EPA after a reasonable opportunity for review and comment by the State. Within 10 days after the entry of this Consent Decree, Texaco shall notify EPA and the State in writing of the name, title, and qualifications of any contractor proposed to be the Supervising Contractor. EPA will issue a

notice of disapproval or an authorization to proceed. If at any time thereafter, Texaco proposes to change a Supervising Contractor, Texaco shall give such notice to EPA and the State and must obtain an authorization to proceed from EPA, after a reasonable opportunity for review and comment by the State, before the new Supervising Contractor performs, directs, or supervises any Work under this Consent Decree.

b. If EPA disapproves a proposed Supervising Contractor, EPA will notify Texaco in writing. Texaco shall submit to EPA and the State a list of contractors, including the qualifications of each contractor, that would be acceptable to Texaco within 30 days of receipt of EPA's disapproval of the contractor previously proposed. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Texaco may select any contractor from that list that is not disapproved and shall notify EPA and the State of the name of the contractor selected within 21 days of EPA's authorization to proceed.

c.. If EPA fails to provide written notice of its authorization to proceed or disapproval as provided in this Paragraph and this failure prevents Texaco from meeting one or more deadlines in a plan approved by the EPA pursuant to this Consent Decree, Texaco may seek relief under the provisions of Section XIX (Force Majeure) hereof.

11. Remedial Design.

a. Texaco agreed to perform certain remedial design tasks identified in Section II.A.1 in the SOW, including preparation of the Preliminary Design Work Plan, pursuant to the Administrative Order on Consent ("AOC") for Remedial Design, U.S. EPA Docket No. 90-03, effective November 15, 1989. The approved Preliminary Design Work Plan is summarized in the Preliminary Design Work Plan Summary. Texaco and the United States hereby agree that the requirements of the Preliminary Design Work Plan Summary will become an enforceable part of this Consent Decree on the effective date of this Consent Decree, and that all other requirements of the AOC will be superseded by the requirements of this Consent Decree, as of the effective date of this Consent Decree. The Preliminary Design Work Plan Summary is hereby incorporated into this Consent Decree as Appendix C.

b. The Preliminary Design Work Plan Summary includes a description of the plans and schedules for implementation of pre-design treatability testing and design, including, but not limited to, plans and schedules for the completion of: (1) Draft and Final Phase I Design, (2) Draft and Final Phase II Pre-Design and (3) Draft and Final Phase II Design. As of the effective date of this Consent Decree, Texaco shall implement the tasks of the Preliminary Design Work Plan Summary that it has not implemented theretofore, and complete all design tasks in accordance with the Preliminary Design Work Plan Summary and the SOW.

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c. Following the effective date of this Consent Decree, all the design deliverables Texaco is required to submit to EPA pursuant to the SOW shall be reviewed by EPA pursuant to Section XII (Submissions Requiring Agency Approval) and must be submitted by Texaco to the State for review and comment.

12. Remedial Action.

a. Within 60 days after the approval of the final design submittal, Texaco shall submit to EPA and the State, a draft work plan for the performance of the Remedial Action at the Site ("Draft Remedial Action Work Plan"). The Draft Remedial Action Work Plan shall provide for construction of the remedy, in accordance with the SOW, as set forth in the design plans and specifications in the approved final design submittal. Within 30 days after receiving EPA's comments on the Draft Remedial Action Work Plan, Texaco shall submit to EPA for approval, and the State for review, a final Remedial Action Work Plan ("Remedial Action Work Plan"). Upon approval by EPA, the Remedial Action Work Plan shall be incorporated into and become enforceable under this Consent Decree.

b. The Remedial Action Work Plan shall contain plans and schedules for implementation of the following remedial action tasks as set forth in the SOW: (1) tentative formulation of the Remedial Action team; (2) method for selection of the contractor; (3) the schedule for developing and submitting other required Remedial Action plans and for completion of the Remedial Action;

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(4) revised cost estimates; (5) a Health and Safety Plan which conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.; (6) methodology for implementation of the Contingency Plan; (7) methodology for implementation of the Construction Quality Assurance Plan; (8) a groundwater monitoring plan; (9) methods for satisfying permitting requirements; (10) methodology for implementation of the Operation and Maintenance Plan; (11) construction quality control plan; and (12) a closeout report documenting procedures and plans for the decontamination of equipment and the disposal of contaminated materials. The Remedial Action Work Plan also shall include a schedule for implementation of all Remedial Action tasks identified in the Final Design submittal.

c. Upon approval of the Remedial Action Work Plan by EPA, after a reasonable opportunity for review and comment by the State, Texaco shall implement the activities required under the Remedial Action Work Plan. Texaco shall submit to EPA and the State all plans, submittals, or other deliverables required under the approved Remedial Action Work Plan in accordance with the approved schedule for review and approval pursuant to Section XII (Submissions Requiring Agency Approval). Unless otherwise directed by EPA, Texaco shall not commence physical on-site activities at the Site prior to approval of the Remedial Action Work Plan.

13. The Work performed by Texaco pursuant to this Consent Decree shall include the obligation to achieve the Performance Standards. The methodology for determining attainment of the

Performance Standards is set forth in Section III of the SOW. EPA's calculation of the methodology for determining attainment of the Performance Standards shall be binding upon Texaco subject only to the right to seek administrative review as set forth in Paragraphs 62, 63 and 64 a. and b.

14. Texaco acknowledges and agrees that nothing in this Consent Decree, the SOW, or the Remedial Design or Remedial Action Work Plans constitutes a warranty or representation of any kind by Plaintiffs that compliance with the work requirements set forth in the SOW and the Work Plans will achieve the Performance Standards. Texaco's compliance with the work requirements shall not foreclose Plaintiffs from seeking compliance with all terms and conditions of this Consent Decree, including, but not limited to, the applicable Performance Standards.

15. Texaco shall, prior to any off-Site shipment of Waste Material resulting from the Work being conducted pursuant to this Decree to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator of such shipment of Waste Material. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

a. Texaco shall include in the written notification the following information, where available: (1) the name and location of the facility to which the Waste Material are to be shipped; (2) the type and quantity of the Waste Material to be shipped; (3) the expected schedule for the shipment of the Waste Material;

and (4) the method of transportation. Texaco shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

b. The identity of the receiving facility and state will be determined by Texaco following the award of the contract for Remedial Action construction. Texaco shall provide the information required by Paragraph 15.a as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

VII. ADDITIONAL RESPONSE ACTIONS

16. In the event that EPA determines or Texaco proposes that additional response actions are necessary to meet the Performance Standards or to carry out the remedy selected in the ROD, notification of such additional response actions shall be provided to the Project Coordinator.

17. Within 30 days of receipt of notice from EPA or Texaco pursuant to Paragraph 16 that additional response actions are necessary (or such longer time as may be specified by EPA), Texaco shall submit for approval by EPA, after reasonable opportunity for review and comment by the State, a work plan for the additional response actions. The plan shall conform to the applicable requirements of Paragraphs 11 and 12. Upon approval of the plan pursuant to Section XII (Submissions Requiring Agency Approval), Texaco shall implement the plan for additional response actions in accordance with the schedule contained therein.

18. Any additional response actions that Texaco proposes are necessary to meet the Performance Standards or to carry out the remedy selected in the ROD shall be subject to approval by EPA, after reasonable opportunity for review and comment by the State, and, if authorized by EPA, shall be completed by Texaco in accordance with plans, specifications, and schedules approved or established by EPA pursuant to Section XII (Submissions Requiring Agency Approval).

19. Texaco may invoke the procedures set forth in Section XX (Dispute Resolution) to dispute EPA's determination that additional response actions are necessary to meet the Performance Standards or to carry out the remedy selected in the ROD. Such a dispute shall be resolved pursuant to Paragraphs 61-66 of this Consent Decree.

VIII. EPA PERIODIC REVIEW

20. Texaco shall conduct any studies and investigations as requested by EPA in order to permit EPA to conduct reviews at least every five years as required by Section 121(c) of CERCLA, any applicable regulations and EPA guidance regarding five-year reviews (OSWER Directive 9355.7-02 entitled "Structure and Components of Five-Year Reviews" and any modifications thereto, hereinafter "EPA Five-Year Review Guidance"). For those five year reviews conducted pursuant to policy as described in EPA's Five-Year Review Guidance, Texaco's obligation under this paragraph shall terminate when EPA issues a certificate of completion of the Work pursuant to paragraph 47 b.

21. If required by Sections 113(k)(2) or 117 of CERCLA, Texaco and the public will be provided with an opportunity to

comment on any further response actions proposed by EPA as a result of the review conducted pursuant to EPA Five-Year Review Guidance or Section 121(c) of CERCLA and to submit written comments for the record during the public comment period. After the period for submission of written comments is closed, the Regional Administrator, EPA Region IX, or his/her delegate will determine in writing whether further response actions are appropriate.

22. If the Regional Administrator, EPA Region IX, or his/her delegate (after providing the State with a reasonable opportunity for review and comment) determines that information received, in whole or in part, during the review conducted pursuant to Section 121(c) of CERCLA or EPA Five-Year Review Guidance, indicates that the Remedial Action is not protective of human health and the environment, Texaco shall undertake any further response actions EPA has determined are appropriate, unless their liability for such further response actions is barred by the Covenant Not to Sue set forth in Section XXII. Texaco shall submit a plan for such work to EPA for approval in accordance with the procedures set forth in Section VI (Performance of the Work by Texaco) and shall implement the plan approved by EPA. Texaco may invoke the procedures set forth in Section XX (Dispute Resolution) to dispute (1) EPA's determination that the remedial action is not protective of human health and the environment, (2) EPA's selection of the further response actions ordered as arbitrary and capricious or otherwise not in accordance with law, or (3) EPA's determination that Texaco's liability for the further response actions requested is reserved in Paragraphs 79, 80, or

82 or otherwise not barred by the Covenant Not to Sue set forth in Section XXII.

IX. QUALITY ASSURANCE, SAMPLING, and DATA ANALYSIS

23. Texaco shall use quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance and monitoring samples in accordance with EPA's "Interim Guidelines and Specifications For Preparing Quality Assurance Project Plans," December 1980, (QAMS-005/80); "Data Quality Objective Guidance," (EPA/540/G87/003 and 004); "EPA NEIC Policies and Procedures Manual," May 1978, revised November 1984, (EPA 330/9-78-001-R); and subsequent amendments to such guidelines upon notification by EPA to Texaco of such amendment. Amended guidelines shall apply only to procedures conducted after such notification. Prior to the commencement of any monitoring project under this Consent Decree, Texaco shall submit to EPA for approval, after a reasonable opportunity for review and comment by the State, a Quality Assurance Project Plan ("QAPP") to EPA and the State that is consistent with the SOW, the NCP and applicable guidance documents. If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP(s) and reviewed and approved by EPA shall be admissible as evidence, without objection, in any proceeding under this Decree. Texaco shall ensure that EPA and State personnel and their authorized representatives are allowed access at reasonable times to all laboratories utilized by Texaco in implementing this Consent Decree. In addition, Texaco shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring.

Texaco shall ensure that the laboratories it utilizes for the analysis of samples taken pursuant to this Decree perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the "Contract Lab Program Statement of Work for Inorganic Analysis" and the "Contract Lab Program Statement of Work for Organic Analysis," dated February 1988, and any amendments made thereto during the course of the implementation of this Decree. Texaco shall ensure that all laboratories they use for analysis of samples taken pursuant to this Consent Decree participate in an EPA or EPA-equivalent QA/QC program.

24. Upon request, Texaco shall allow split or duplicate samples to be taken by EPA and the State or their authorized representatives. Texaco shall notify EPA and the State not less than 28 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA and the State shall have the right to take any additional samples that EPA or the State deem necessary. Upon request, EPA and the State shall allow Texaco to take split or duplicate samples of any samples it takes as part of the Plaintiffs' oversight of Texaco's implementation of the Work.

25. Texaco shall submit to EPA and the State 2 copies each of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Texaco with respect to the Site and/or the implementation of this Consent Decree unless EPA agrees otherwise.

26. Notwithstanding any provision of this Consent Decree, the United States and the State hereby retains all of its information

gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

X. ACCESS

27. Commencing upon the date of lodging of this Consent Decree, Texaco agrees to provide the United States, the State, and their representatives, including EPA and its contractors, access at all reasonable times to the Site and any other property to which access is required for the implementation of this Consent Decree, to the extent access to the property is controlled by Texaco, for the purposes of conducting any activity related to this Consent Decree including, but not limited to:

a. Monitoring the Work;

b. Verifying any data or information submitted to the United States;

c. Conducting investigations relating to contamination at or near the Site;

d. Obtaining samples;

e. Assessing the need for, planning, or implementing additional response actions at or near the Site;

f. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Texaco or its agents, consistent with Section XXV; and

g. Assessing Texaco's compliance with this Consent Decree.

28. To the extent that the Site or any other property to which access is required for the implementation of this Consent Decree is owned or controlled by persons other than Texaco,

Texaco shall use best efforts to secure from such persons access for Texaco, as well as for the United States and the State and their representatives, including, but not limited to, their contractors, as necessary to effectuate this Consent Decree. For purposes of this Paragraph "best efforts" includes the payment of reasonable sums of money in consideration of access. If any access required to complete the Work is not obtained within 45 days of the date of lodging of this Consent Decree, or within 45 days of the date EPA notifies Texaco in writing that additional access beyond that previously secured is necessary, Texaco shall promptly notify the United States, and shall include in that notification a summary of the steps Texaco has taken to attempt to obtain access. The United States or the State may, as it deems appropriate, assist Texaco in obtaining access. Texaco shall reimburse the United States or the State, in accordance with the procedures in Section XVII (Reimbursement of Response Costs), for all costs incurred by the United States in obtaining access.

29. Notwithstanding any provision of this Consent Decree, the United States and the State retain all of their access authorities and rights, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

XI. REPORTING REQUIREMENTS

30. In addition to any other requirement of this Consent Decree, Texaco shall submit to EPA and the State two copies of written quarterly progress reports that: (a) describe the actions which have been taken toward achieving compliance with this

Consent Decree during the previous quarter; (b) include a summary of all results of sampling and tests and all other data received or generated by Texaco or its contractors or agents in the previous month; (c) identify all work plans, plans and other deliverables required by this Consent Decree completed and submitted during the previous quarter; (d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next quarter and provide other information relating to the progress of construction; and (e) identify possible delays and problems in the upcoming quarter and a description of efforts made to mitigate those delays or anticipated delays. Texaco shall submit these progress reports to EPA and the State by the twentieth day following the end of each quarter until EPA notifies Texaco pursuant to Paragraph 47.b of Section XV (Certification of Completion). The first quarterly progress report must be submitted 90 days following the lodging of this Consent Decree. If requested by EPA or the State, Texaco shall also provide briefings for EPA and the State to discuss the progress of the Work.

31. Texaco shall notify EPA of any change in the schedule described in the quarterly progress report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than seven days prior to the performance of the activity.

32. Upon the occurrence of any event during performance of the Work that Texaco is required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency Planning and

Community Right-to-know Act (EPCRA), Texaco shall within 24 hours of the on-set of such event orally notify the EPA Project Coordinator or the Alternate EPA Project Coordinator (in the event of the unavailability of the EPA Project Coordinator), or, in the event that neither the EPA Project Coordinator or Alternate EPA Project Coordinator is available, the Emergency Response Section, Region IX, United States Environmental Protection Agency. These reporting requirements are in addition to the reporting required by CERCLA Section 103 or EPCRA Section 304.

33. Within 20 days of the onset of such an event, Texaco shall furnish to Plaintiffs a written report, signed by Texaco's Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion of such an event, Texaco shall submit a report setting forth all actions taken in response thereto.

34. Texaco shall submit two copies of all plans, reports, and data required by the SOW, the Remedial Design Work Plan, the Remedial Action Work Plan, or any other approved plans to EPA in accordance with the schedules set forth in such plans. Texaco shall simultaneously submit two copies of all such plans, reports and data to the State.

35. All reports and other documents submitted by Texaco to EPA (other than the monthly progress reports referred to above) which purport to document Texaco's compliance with the terms of this Consent Decree shall be signed by an authorized representative of Texaco.

XII. SUBMISSIONS REQUIRING AGENCY APPROVAL

36. After review of any plan, report or other item which is required to be submitted for approval pursuant to this Consent Decree, EPA, after reasonable opportunity for review and comment by the State, shall: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Texaco modify the submission; or (e) any combination of the above.

37. In the event of approval, approval upon conditions, or modification by EPA due to a non-material defect, pursuant to Paragraphs 36(a), (b), or (c), Texaco shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA subject only to its right to invoke the Dispute Resolution procedures set forth in Section XX (Dispute Resolution) with respect to the modifications or conditions made by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Paragraph 36(c) and the submission has a material defect, EPA retains its right to seek stipulated penalties, as provided in Section XXI.

38. a. Upon receipt of a notice of disapproval pursuant to Paragraph 36(d) or a notice of EPA's intent to modify the submission pursuant to Paragraph 36(c) due to a material defect, Texaco shall, within 14 days, the time specified in Paragraphs 11 or 12, if applicable, or such other longer time period as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other item for approval. Any

stipulated penalties applicable to the submission, as provided in Section XXI, shall accrue during the 14-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect as provided in Paragraph 40.

b. Notwithstanding the receipt of a notice of disapproval pursuant to Paragraph 36(d) or a notice of EPA's intent to modify due to a material defect pursuant to Paragraph 36(c), Texaco shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Texaco of any liability for stipulated penalties under Section XXI (Stipulated Penalties).

39. In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require Texaco to correct the deficiencies, in accordance with the preceding Paragraphs. EPA also retains the right to amend or develop the plan, report or other item. Texaco shall implement any such plan, report, or item as amended or developed by EPA, subject only to their right to invoke the procedures set forth in Section XX (Dispute Resolution).

40. If upon resubmission, a plan, report, or item is disapproved or modified by EPA due to a material defect, Texaco shall be deemed to have failed to submit such plan, report, or item timely and adequately unless Texaco invokes the dispute resolution procedures set forth in Section XX (Dispute Resolution) and EPA's action is overturned pursuant to that Section. The provisions of Section XX (Dispute Resolution) and

Section XXI (Stipulated Penalties) shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is upheld, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XXI.

41. All plans, reports, and other items required to be submitted to EPA under this Consent Decree shall, upon approval or modification by EPA, be enforceable under this Consent Decree. In the event EPA approves or modifies a portion of a plan, report, or other item required to be submitted to EPA under this Consent Decree, the approved or modified portion shall be enforceable under this Consent Decree.

XIII. PROJECT COORDINATORS

42. Within 20 days of entry of this Consent Decree, Texaco, the State and EPA will notify each other, in writing, of the name, address and telephone number of their respective designated Project Coordinators and Alternate Project Coordinators. If a Project Coordinator or Alternate Project Coordinator initially designated is changed, the identity of the successor will be given to the other parties at least 5 working days before the changes occur, unless impracticable, but in no event later than the actual day the change is made. Texaco's Project Coordinator shall be subject to disapproval by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work. Texaco's Project Coordinator shall not be an attorney for Texaco in this matter. He or she may assign other representatives, including other contractors, to serve as a Site

representative for oversight of performance of daily operations during remedial activities.

43. Plaintiffs may designate other representatives, including, but not limited to, EPA and State employees, and federal and State contractors and consultants, to observe and monitor the progress of any activity undertaken pursuant to this Consent Decree. EPA's Project Coordinator and Alternate Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and an On-Scene Coordinator (OSC) by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's Project Coordinator or Alternate Project Coordinator shall have authority, consistent with the National Contingency Plan, to halt any Work required by this Consent Decree and to take any necessary response action when s/he determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material.

XIV. ASSURANCE OF ABILITY TO COMPLETE WORK

44. Within 45 days of entry of this Consent Decree, Texaco shall establish and maintain financial security in the amount of $4 million in one of the following forms:

(a) A surety bond guaranteeing performance of the Work;

(b) One or more irrevocable letters of credit equalling the total estimated cost of the Work;

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(c) A trust fund;

(d) A guarantee to perform the Work by one or more parent corporations or subsidiaries, or by one or more unrelated corporations that have a substantial business relationship with Texaco; or

(e) A demonstration that Texaco satisfies the requirements of 40 C.F.R. Part 264.143(f).

45. If Texaco seeks to demonstrate the ability to complete the Work through a guarantee by a third party pursuant to Paragraph 44(d) of this Consent Decree, Texaco shall demonstrate that the guarantor satisfies the requirements of 40 C.F.R. Part 264.143(f). If Texaco seeks to demonstrate its ability to complete the Work by means of the financial test or the corporate guarantee pursuant to Paragraph 44(d) or (e), it shall resubmit sworn statements conveying the information required by 40 C.F.R. Part 264.143(f) annually, on the anniversary of the effective date of this Consent Decree. In the event that EPA, after a reasonable opportunity for review and comment by the State, determines at any time that the financial assurances provided pursuant to this Section are inadequate, Texaco shall, within 30 days of receipt of notice of EPA's determination, obtain and present to EPA for approval one of the other forms of financial assurance listed in Paragraph 43 of this Consent Decree. Texaco's inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under this Consent Decree.

XV. CERTIFICATION OF COMPLETION

46. Completion of the Remedial Action

a. Within 90 days after Texaco concludes that the Remedial Action has been fully performed and the Performance Standards have been attained, Texaco shall schedule and conduct a pre-certification inspection to be attended by Texaco, and EPA and the State. If, after the pre-certification inspection, Texaco still believes that the Remedial Action has been fully performed and the Performance Standards have been attained, it shall submit a written report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XII (Submissions Requiring Agency Approval) within 30 days of the inspection. In the report, a registered professional engineer and Texaco's Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement, signed by a responsible corporate official of Texaco or Texaco's Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that the Remedial Action or any portion thereof has not been completed in accordance with this Consent Decree or that the Performance Standards have not been achieved, EPA will notify Texaco in

writing of the activities that must be undertaken to complete the Remedial Action and achieve the Performance Standards. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Texaco to submit a schedule to EPA for approval pursuant to Section XII (Submissions Requiring Agency Approval). Texaco shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been fully performed in accordance with this Consent Decree and that the Performance Standards have been achieved, EPA will so certify in writing to Texaco. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of this Consent Decree, including, but not limited to, Section XXII (Covenants Not to Sue by Plaintiffs). Certification of Completion of the Remedial Action shall not affect Texaco's obligations under this Consent Decree.

47. Completion of the Work

a. Within 90 days after Texaco concludes that all phases of the Work (including O & M), have been fully performed, Texaco shall schedule and conduct a pre-certification inspection to be attended by Texaco, EPA and the State. If, after the pre-

certification inspection, Texaco still believes that the Work has been fully performed, Texaco shall submit a written report by a registered professional engineer stating that the Work has been completed in full satisfaction of the requirements of this Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of Texaco or Texaco's Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If, after review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Texaco in writing of the activities that must be undertaken to complete the Work. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Texaco to submit a schedule to EPA for approval pursuant to Section XII (Submissions Requiring Agency Approval). Texaco shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent request for Certification of Completion by Texaco and after a reasonable opportunity for review and comment by the State, that the Work has been fully performed in accordance with

this Consent Decree, EPA will so notify Texaco in writing.

XVI. EMERGENCY RESPONSE

48. In the event of any action or occurrence during the performance of the Work which causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Texaco shall, subject to Paragraph 49, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator. If neither of these persons is available, Texaco shall notify the EPA Emergency Response Section, Region IX. Texaco shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Texaco fails to take appropriate response action as required by this Section, and EPA or, as appropriate, the State take such action instead, Texaco shall reimburse EPA and the State all costs of the response action not inconsistent with the NCP pursuant to Section XVII (Reimbursement of Response Costs).

49. Nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit any authority of the United States, or the State, to take, direct, or order all appropriate action or to seek an order from the Court to protect human health and the environment or to prevent, abate, respond to, or minimize

an actual or threatened release of Waste Material on, at, or from the Site.

XVII. REIMBURSEMENT OF RESPONSE COSTS

50. Within 30 days of the effective date of this Consent Decree, Texaco shall:

a. RESERVED

b. Pay to the State $ 107,607.12 in the form of a certified check or checks made payable to State of California, in reimbursement of Past Response Costs incurred by the State. Texaco shall send the certified check(s) to Department of Toxic Substances Control, Accounting Office, 400 P Street, 4th Floor, P.O. Box 806, Sacramento, California.

51. Texaco shall reimburse the United States and the State for all Future Response Costs not inconsistent with the National Contingency Plan incurred by the United States and the State. The United States and the State will each send Texaco a bill requiring payment that includes a summary of costs incurred by the Department of Justice, a summary of costs incurred by the State and a copy of EPA's Cost Documentation Management System ("CDMS") report, which includes direct and indirect costs incurred by EPA, DOJ and the State and their contractors on an annual basis. Texaco shall make all payments within 40 days of Texaco's receipt of each bill requiring payment, except as otherwise provided in Paragraph 52. Texaco shall make all payments to the United States which are required by this Paragraph in the form of a certified check or checks made payable to "EPA Hazardous Substance Superfund" and referencing CERCLA Number Site 9TJ6 and DOJ Case Number 90-11-2-840. Texaco shall

forward the certified check(s) to U.S. EPA Region IX, Attention: Superfund Accounting, P.O. Box 360863M, Pittsburg, Pennsylvania 15251. Texaco shall make all payments to the State which are required pursuant to this Paragraph in the form of a certified check or checks made payable to the State of California and shall forward the certified check to the Department of Toxic Substances Control, Accounting Office, 400 P Street, 4th Floor, P.O. Box 806, Sacramento, California 95812-0806.

52. Texaco may contest payment of any Future Response Costs under Paragraph 51 if it determines that the United States or the State has made an accounting error or if they allege that a cost item that is included represents costs that are inconsistent with the NCP. Such objection shall be made in writing within 40 days of receipt of the bill and must be sent to the United States (if the United States' accounting is being disputed) or the State (if the State's accounting is being disputed) pursuant to Section XXVII (Notices and Submissions). Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Texaco shall within the 40 day period pay all uncontested Future Response Costs to the United States or the State in the manner described in Paragraph 51. Simultaneously, Texaco shall establish an interest bearing escrow account in a federally-insured bank duly chartered in the State of California and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Texaco shall send to the United States, as provided in Section XXVII (Notices and Submissions), and the State a copy of the transmittal letter and check paying the

uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Texaco shall initiate the Dispute Resolution procedures in Section XX (Dispute Resolution). If the United States or the State prevail in the dispute, within 5 days of the resolution of the dispute, Texaco shall pay the sums due (with accrued interest) to the United States or the State, if State costs are disputed, in the manner described in Paragraph 51. If Texaco prevails concerning any aspect of the contested costs, Texaco shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to the United States or the State, if State costs are disputed in the manner described in Paragraph 51; Texaco shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Texaco's obligation to reimburse the United States and the State for their Future Response Costs.

53. In the event that the payments required by Paragraph 50 are not made within 30 days of the effective date of this Consent Decree or the payments required by Paragraph 51 are not made within 40 days of Texaco's receipt of the bill, Texaco shall pay interest on the unpaid balance at the rate established pursuant

to Section 107(a) of CERCLA, 42 U.S.C. § 9607. The interest to be paid on Past Response Costs shall begin to accrue on the effective date of the Consent Decree. The interest on Future Response Costs shall begin to accrue 30 days from Texaco's receipt of the bill. Interest shall accrue at the rate specified through the date of Texaco's payment. Payments of interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiffs by virtue of Texaco's failure to make timely payments under this Section.

XVIII. INDEMNIFICATION AND INSURANCE

54. The United States and the State do not assume any liability by entering into this agreement or by virtue of any designation of Texaco as EPA's authorized representative under Section 104(e) of CERCLA. Texaco shall indemnify, save and hold harmless the United States, the State, and their officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, acts or omissions of Texaco, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Texaco as EPA's authorized representative under Section 104(e) of CERCLA. Further, Texaco agrees to pay the United States and the State all costs they incur including, but not limited to, attorneys fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States or the State based on acts or

omissions of Texaco, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree. Neither the United States nor the State shall be held out as a party to any contract entered into by or on behalf of Texaco in carrying out activities pursuant to this Consent Decree. Neither Texaco nor any such contractor shall be considered an agent of the United States or the State. Nothing in this Consent Decree, however, shall require indemnification by Texaco with respect to any claim or causes of action against the United States or the State based on negligent action by the United States or the State (not including oversight or approval of Texaco's plans or activities).

55. Texaco waives all claims against the United States and the State for damages or reimbursement or for set-off of any payments made or to be made to the United States or the State, arising from or on account of any contract, agreement, or arrangement between Texaco and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Texaco shall indemnify and hold harmless the United States and the State with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Texaco and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

56. No later than 15 days before commencing any on-site Work, Texaco shall secure, and shall maintain until the first

anniversary of EPA's Certification of Completion of the Remedial Action pursuant to Paragraph 46.b. of Section XV (Certification of Completion) comprehensive general liability insurance and automobile insurance with limits of two million dollars, combined single limit naming as additional insured the United States and the State. In addition, for the duration of this Consent Decree, Texaco shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Texaco in furtherance of this Consent Decree. Prior to commencement of the Work under this Consent Decree, Texaco shall provide to EPA and the State certificates of such insurance and a copy of each insurance policy. Texaco shall resubmit such certificates and copies of policies each year on the anniversary of the effective date of this Consent Decree. If Texaco demonstrates by evidence satisfactory to EPA and the State that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Texaco need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor.

XIX. FORCE MAJEURE

57. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Texaco or of any entity controlled by Texaco, including, but not limited to, its contractors and subcontractors, that delays or prevents the performance of any obligation under this Consent

Decree despite Texaco's best efforts to fulfill the obligation. The requirement that Texaco exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent possible. "Force Majeure" does not include financial inability to complete the Work or a failure to attain the Performance Standards.

58. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Texaco shall notify orally EPA's Project Coordinator or, in his or her absence, EPA's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, the Director of the Hazardous Waste Management Division, EPA Region IX, within 48 hours of when Texaco first knew or should have known that the event might cause a delay. Within 5 days thereafter, Texaco shall provide in writing to EPA and the State an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Texaco's rationale for attributing such delay to a force majeure event if they intend to assert such a claim; and a statement as to whether, in the opinion of Texaco, such event may cause or contribute to an endangerment to public health, welfare or the environment. Texaco shall include with

any notice all available documentation supporting its claim that the delay was attributable to a force majeure. Failure to comply with the above requirements shall preclude Texaco from asserting any claim of force majeure for that event. Texaco shall be deemed to have notice of any circumstance of which their contractors or subcontractors had or should have had notice.

59. If EPA, after a reasonable opportunity for review and comment by the State, agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA, after a reasonable opportunity for review and comment by the State, for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA, after a reasonable opportunity for review and comment by the State, does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Texaco in writing of its decision. If EPA, after a reasonable opportunity for review and comment by the State, agrees that the delay is attributable to a force majeure event, EPA will notify Texaco in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

60. If Texaco elects to invoke the dispute resolution procedures set forth in Section XX (Dispute Resolution), it shall do so no later than 15 days after receipt of EPA's notice. In

any such proceeding, Texaco shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Texaco complied with the requirements of Paragraphs 57 and 58, above. If Texaco carries this burden, the delay at issue shall be deemed not to be a violation by Texaco of the affected obligation of this Consent Decree identified to EPA and the Court.

XX. DISPUTE RESOLUTION

61. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the United States to enforce obligations of Texaco that have not been disputed in accordance with this Section.

62. Any dispute which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute.

63. a. In the event that the parties cannot resolve a

dispute by informal negotiations under the preceding Paragraph, then the position advanced by EPA (after providing the State with a reasonable opportunity for review and comment) shall be considered binding unless, within 10 days after the conclusion of the informal negotiation period, Texaco invokes the formal dispute resolution procedures of this Section by serving on the United States and the State, a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis or opinion supporting that position and any supporting documentation relied upon by Texaco. The Statement of Position shall specify Texaco's position as to whether formal dispute resolution should proceed under paragraph 64 or 65.

b. Within fourteen (14) days after receipt of Texaco's Statement of Position, EPA will serve on Texaco its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 64 or 65.

c. If there is disagreement between EPA and Texaco as to whether dispute resolution should proceed under Paragraph 64 or 65, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if Texaco ultimately appeals to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 64 and 65.

64. Formal dispute resolution for disputes pertaining to the

selection or adequacy of any response action and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Decree; and (2) the adequacy of the performance of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be construed to allow any dispute by Texaco regarding the validity of the ROD's provisions.

a. An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant to this Paragraph. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b. The Director of the Waste Management Division, EPA Region IX, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 64.a. This decision shall be binding upon Texaco, subject only to the right to seek judicial review pursuant to Paragraph 64.c. and d.

c. Any administrative decision made by EPA pursuant to Paragraph 64.b. shall be reviewable by this Court, provided that a notice of judicial appeal is filed by Texaco with the Court and served on all Parties within 10 days of receipt of EPA's

decision. The notice of judicial appeal shall include a description of the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States may file a response to Texaco's notice of judicial appeal.

d. In proceedings on any dispute governed by this Paragraph, Texaco shall have the burden of demonstrating that the decision of the Waste Management Division Director is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraphs 64.a.

65. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a. Following receipt of Texaco's Statement of Position submitted pursuant to Paragraph 63, the Director of the Waste Management Division, EPA Region IX, will issue a final decision resolving the dispute. The Waste Management Division Director's decision shall be binding on Texaco unless, within 10 days of receipt of the decision, Texaco files with the Court and serves on the parties a notice of judicial appeal setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States may file a response to

Texaco's notice of judicial appeal.

b. Notwithstanding Paragraph M of Section I (Background) of this Consent Decree, judicial review of any dispute governed by this Paragraph shall be governed by applicable provisions of law.

66. The invocation of formal dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation of Texaco under this Consent Decree not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 75. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Decree. In the event that Texaco does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XXI (Stipulated Penalties).

XXI. STIPULATED PENALTIES

67. Texaco shall be liable for stipulated penalties in the amounts set forth in Paragraphs 68 and 69 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XIX (Force Majeure). "Compliance" by Texaco shall include completion of the activities under this Consent Decree or any work plan or other plan approved under this Consent Decree identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Decree and within the specified time

schedules established by and approved under this Consent Decree.

68. a. The following stipulated penalties shall be payable per violation per day to the United States for any noncompliance identified in Subparagraph 68b:

Penalty Per Violation Per Day	Period of Noncompliance in Days
$5,000	1 - 20
$7,500	21 - 35
$15,000	36 and beyond

b. Failure to submit the Final Design Report and the Extraction and Treatment System Construction Completion Report as required by the SOW.

69.a. The following stipulated penalties shall be payable per violation per day to the United States where EPA determines that there has been a noncompliance identified in Subparagraph 69 b:

Penalty Per Violation Per Day	Period of Noncompliance in Days
$3,000	1 - 15
$4,500	16 - 30
$7,500	31 and beyond

b. Failure to submit a timely or adequate Final Remedial Action Work Plan, Construction Quality Assurance Plan, Construction Quality Control Plan, Operation and Maintenance Plan, Monitoring and Confirmation Sampling Plan, Health and Safety Plan, Closeout Report, Quarterly Progress Reports, as these deliverables are defined in the SOW; failure to timely commence, perform or complete field work, construction or operation of any element of the Work

c. The following stipulated penalties shall be payable per violation per day to the United States where EPA determines there has been noncompliance identified in 69d:

Penalty per Violation per Day	Period of Noncompliance in Days
$ 3,000	1 - 14
$ 4,000	15 - 30
$ 5,000	31 and beyond

d. Texaco's failure to comply with any other requirements of this Consent Decree, including undertaking unauthorized or unapproved work, with the exception of any failure that is defined in Paragraphs 68b or 69b of this Consent Decree.

70. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 83 of Section XXII (Covenants Not to Sue by Plaintiffs), Texaco shall be liable for a stipulated penalty in the amount of $500,000 thousand.

71. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Decree.

72. Following EPA's determination that Texaco has failed to comply with a requirement of this Consent Decree, EPA may give Texaco written notification of the same and describe the noncompliance. EPA may send Texaco a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Texaco of a violation.

73. All penalties owed to the United States under this section shall be due and payable within 30 days of Texaco's receipt from EPA of a demand for payment of the penalties, unless

Texaco invokes the Dispute Resolution procedures under Section XX (Dispute Resolution). All payments under this Section shall be paid by certified check made payable to "EPA Hazardous Substances Superfund," shall be mailed to U.S. Region IX, Attention: Superfund Accounting, P.O. Box 360863M, Pittsburg, Pennsylvania, 15251, and shall reference CERCLA Number Site # 9TJ6 and DOJ Case Number 90-11-2-840. Texaco shall also send copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s) to the United States as provided in Section XXVII (Notices and Submissions).

74. The payment of penalties shall not alter in any way Texaco's obligation to complete the performance of the Work required under this Consent Decree.

75. Penalties shall continue to accrue as provided in Paragraph 71 during any dispute resolution period, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 15 days of the agreement or the receipt of EPA's decision or order;

b. If the dispute is appealed to this Court and the United States prevails in whole or in part, Texaco shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days of receipt of the Court's decision or order, except as provided in Subparagraph c below;

c. If the District Court's decision is appealed by any Party, Texaco shall pay all accrued penalties determined by the District Court to be owing to the United States into an interest-

bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Texaco to the extent that it prevails.

76. a. If Texaco fails to pay stipulated penalties when due, the United States may institute proceedings to collect the penalties, as well as interest. Texaco shall pay interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 73 at the rate established pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607.

b. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States or the State to seek any other remedies or sanctions available by virtue of Texaco's violation of this Decree or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA. In EPA's unreviewable discretion, and not subject to Section XX (Dispute Resolution), EPA may waive, in whole or in part, the stipulated penalties under this section.

77. No payments made under this Section shall be tax deductible for Federal or State tax purposes.

XXII. COVENANTS NOT TO SUE BY PLAINTIFFS

78. In consideration of the actions that will be performed and the payments that will be made by Texaco under the terms of the Consent Decree, and except as specifically provided in Paragraphs 79, 80, and 82 of this Section, the United States

covenants not to sue or to take administrative action against Texaco pursuant to Sections 106 and 107(a) of CERCLA and Section 7003 of RCRA relating to the Site. Except with respect to future liability, these covenants not to sue shall take effect upon the receipt by Plaintiffs of the payments required by Paragraph 50 of Section XVII (Reimbursement of Response Costs). With respect to future liability, these covenants not to sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Paragraph 46.b of Section XV (Certification of Completion). These covenants not to sue are conditioned upon the complete and satisfactory performance by Texaco of its obligations under this Consent Decree. These covenants not to sue extend only to Texaco and do not extend to any other person.

79. United States' Pre-certification reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Texaco (1) to perform further response actions relating to the Site or (2) to reimburse the United States for additional costs of response if, prior to certification of completion of the Remedial Action:

(i) conditions at the Site, previously unknown to EPA, are discovered, or

(ii) information, previously unknown to EPA, is received, in whole or in part,

and these previously unknown conditions or information together with any other relevant information indicates that the Remedial

Action is not protective of human health or the environment.

80. United States' Post-certification reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Texaco (1) to perform further response actions relating to the Site or (2) to reimburse the United States for additional costs of response if, subsequent to certification of completion of the Remedial Action :

(i) conditions at the Site, previously unknown to EPA, are discovered, or

(ii) information, previously unknown to EPA, is received, in whole or in part,

and these previously unknown conditions or this information together with other relevant information indicate that the Remedial Action is not protective of human health or the environment.

81. For purposes of Paragraph 79, the information and the conditions known to EPA shall include only that information and those conditions set forth in the Record of Decision for the Site and the administrative record supporting the Record of Decision. For purposes of Paragraphs 80, the information previously received by and the conditions known to EPA shall include only that information and those conditions set forth in the Record of Decision, the administrative record supporting the Record of Decision, and any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of

Completion of the Remedial Action.

82. General reservations of rights. The covenants not to sue set forth in this Section do not pertain to any matters other than those expressly specified in Paragraphs 78 and 85. The United States and the State reserve, and this Consent Decree is without prejudice to, all rights against Texaco with respect to all other matters, including but not limited to, the following:

(1) claims based on a failure by Texaco to meet a requirement of this Consent Decree;

(2) liability arising from the past, present, or future disposal, release, or threat of release of Waste Materials outside of the Site;

(3) liability for damages for injury to, destruction of, or loss of natural resources;

(4) liability for response costs that have been or may be incurred by the Department of Interior;

(5) criminal liability;

(6) liability for violations of federal or state law which occur during or after implementation of the Remedial Action;

(7) liability for costs that the United States will incur related to the Site but which are not covered by this Consent Decree.

83. In the event EPA determines that Texaco has failed to implement any provisions of the Work in an adequate or timely manner, EPA may perform any and all portions of the Work as EPA determines necessary. Texaco may invoke the procedures set forth

in Section XX (Dispute Resolution) to dispute EPA's determination that Texaco failed to implement a provision of the Work in an adequate or timely manner as arbitrary and capricious or otherwise not in accordance with law. Such dispute shall be resolved on the administrative record. Costs incurred by the United States in performing the Work pursuant to this Paragraph shall be considered Future Response Costs that Texaco shall pay pursuant to Section XVII (Reimbursement of Response Costs).

84. Notwithstanding any other provision of this Consent Decree, the United States and the State retain all authority and reserve all rights to take any and all response actions authorized by law.

85. State's Covenant Not To Sue. In consideration of the actions that will be performed and the payments that will be made by Texaco under the terms of the Consent Decree, and except as specifically provided in Paragraph 82 of this Section, the State covenants not to sue Texaco pursuant to Section 107(a) of CERCLA and California Health and Safety Code 25358.3 or to take administrative action against Texaco under California Health and Safety Code 25358.3 relating to the Site. Except with respect to future liability, these covenants not to sue will take effect upon the receipt by the State of the payments required by Paragraph 50 of Section XVII. With respect to future liability, these covenants not to sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Paragraph 46.b of Section XV. These covenants not to sue are conditioned upon the complete and satisfactory performance by Texaco of its obligations under this Consent Decree. These covenants not to

sue extend only to Texaco and do not extend to any other person.

XXIII. COVENANTS BY TEXACO

86. Texaco hereby covenants not to sue and agrees not to assert any claims or causes of action against the United States or the State with respect to the Site or this Consent Decree, including, but not limited to, any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through CERCLA Sections 106(b)(2), 111, 112, 113 or any other provision of law, or any claims arising out of response activities at the Site. However, Texaco reserves, and this Consent Decree is without prejudice to, actions against the United States or the State based on negligent actions taken directly by the United States (not including oversight or approval of Texaco's plans or activities) or the State that are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

XXIV. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

87. Nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution),

defenses, claims, demands, and causes of action which each party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a party hereto.

88. With regard to claims for contribution against Texaco for matters addressed in this Consent Decree, the Parties hereto agree that Texaco is entitled to such protection from contribution actions or claims as is provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2).

89. Texaco agrees that with respect to any suit or claim for contribution brought by Texaco for matters related to this Consent Decree, it will notify the United States and the State in writing no later than 60 days prior to the initiation of such suit or claim.

90. Texaco also agrees that with respect to any suit or claim for contribution brought against it for matters related to this Consent Decree it will notify in writing the United States and the State within 10 days of service of the complaint on Texaco. In addition, Texaco shall notify the United States and the State within 10 days of service or receipt of any Motion for Summary Judgment and within 10 days of receipt of any order from a court setting a case for trial.

91. In any subsequent administrative or judicial proceeding initiated by the United States or the State for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Texaco shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion,

claim-splitting, or other defenses based upon any contention that the claims raised by the United States or the State in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section XXII (Covenants Not to Sue by Plaintiffs).

XXV. ACCESS TO INFORMATION

92. Texaco shall provide to EPA and the State, upon request, copies of all documents and information within its possession or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Consent Decree, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Texaco shall also make available to EPA and the State, for purposes of investigation, information gathering, or testimony, its employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

93. a. Texaco may assert business confidentiality claims covering part or all of the documents or information submitted to Plaintiffs under this Consent Decree to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to EPA and the State, or if EPA has notified Texaco

that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA, the public may be given access to such documents or information without further notice to Texaco.

b. Texaco may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Texaco asserts such a privilege in lieu of providing documents, it shall provide the Plaintiffs with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information: and (6) the privilege asserted by Texaco. However, no documents, reports or other information created or generated pursuant to the SOW, Preliminary Design Work Plan Summary or Sections VI, VII, VIII, IX, XI, XII, XV of the Consent Decree shall be withheld on the grounds that they are privileged.

94. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XXVI. RETENTION OF RECORDS

95. Until 10 years after Texaco's receipt of EPA's notification pursuant to Paragraph 47.b of Section XV (Certification of Completion of the Work), Texaco shall preserve

and retain all records and documents now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or liability of any person for response actions conducted and to be conducted at the Site, regardless of any corporate retention policy to the contrary. Until 10 years after Texaco's receipt of EPA's notification pursuant to Paragraph 47.b of Section XV (Certification of Completion), Texaco shall also instruct its contractors and agents to preserve all documents, records, and information of whatever kind, nature or description relating to the performance of the Work.

96. At the conclusion of this document retention period, Texaco shall notify the United States and the State at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States or the State, Texaco shall deliver any such records or documents to EPA or the State. Texaco may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Texaco asserts such a privilege, it shall provide the Plaintiffs with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information: and (6) the privilege asserted by Texaco. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent

Decree shall be withheld on the grounds that they are privileged.

97. Texaco hereby certifies that it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information relating to its potential liability regarding the Site since notification of potential liability by the United States on or about October 5, 1992 or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Section 104(e) and 122(e) of CERCLA and Section 3007 of RCRA.

XXVII. NOTICES AND SUBMISSIONS

98. Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be sent by one party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, EPA, the State, and Texaco, respectively.

As to the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Ben Franklin Station
Washington, D.C. 20044
Re: DJ # 90-11-2-840

As to EPA:

Michael Montgomery
EPA Project Coordinator
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105
Telephone (415) 744-2403

As to the State:

Hamid Saebfar,
Acting Chief Site Mitigation Branch
Region III
Department of Toxic Substances Control
1011 North Grandview Avenue
Glendale, California 91201

As to Texaco:

Glenn R. Anderson
Texaco's Project Coordinator
Texaco Inc.
EHS Division, Suite 830
10 Universal City Plaza
Universal City, CA 91608
Telephone: (818) 505-2680

XXVIII. EFFECTIVE DATE

99. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court, except as otherwise provided herein.

XXIX. RETENTION OF JURISDICTION

100. This Court retains jurisdiction over both the subject matter of this Consent Decree and Texaco for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Decree, or to effectuate or enforce

compliance with its terms, or to resolve disputes in accordance with Section XX (Dispute Resolution) hereof.

XXX. APPENDICES

101. The following appendices are attached to and incorporated into this Consent Decree:

"Appendix A" is the ROD.

"Appendix B" is the SOW.

"Appendix C" is the Preliminary Design Work Plan Summary.

"Appendix D" is the description and/or map of the Site.

XXXI. COMMUNITY RELATIONS

102. Texaco shall propose to EPA and the State its participation in the community relations plan to be developed by EPA. EPA will determine the appropriate role for Texaco under the Plan. Texaco shall also cooperate with EPA and the State in providing information regarding the Work to the public. As requested by EPA or the State, Texaco shall participate in the preparation of such information for dissemination to the public and in public meetings which may be held or sponsored by EPA or the State to explain activities at or relating to the Site.

XXXII. MODIFICATION

103. Except for (1) changes to the schedules specified in this Consent Decree, (2) changes to the Parties' addresses in paragraph 98, or (3) as provided for in paragraph 104, there shall be no modification of this Consent Decree without the written agreement of the United States, the State and Texaco and entry by the Court.

104. The United States and Texaco may agree to modify the

SOW, the Preliminary Design Work Plan Summary, and any documents or deliverables approved by the United States pursuant to this decree. Any such modification must be in writing and must be signed by EPA and Texaco. No such modifications shall change any of the requirements of the body of the Consent Decree (i.e., the Consent Decree exclusive of those attachments which have been incorporated into the Decree by reference) or the ROD. Prior to providing its approval to any modification pursuant to this paragraph, the United States will provide the State with a reasonable opportunity to review and comment on the proposed modification.

105. Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Decree.

XXXIII. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

106. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations which indicate that the Consent Decree is inappropriate, improper, or inadequate. Texaco consents to the entry of this Consent Decree without further notice.

107. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any party and the terms of the agreement may not be used as evidence in any litigation between

the Parties.

XXXIV. SIGNATORIES/SERVICE

108. The undersigned representative of Texaco and the State and the Chief of the Environmental Enforcement Section, Environment and Natural Resources of the Department of Justice certify that each of them is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such party to this document.

109. Texaco hereby agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified Texaco in writing that it no longer supports entry of the Consent Decree. Texaco shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of Texaco with respect to all matters arising under or relating to this Consent Decree. Texaco hereby agrees to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons.

SO ORDERED THIS 10th DAY OF August, 1993

Spencer Letts

United States District Judge

THE UNDERSIGNED PARTIES enter into this Consent Decree in the matter of United States v. Texaco, Inc., relating to the Pacific Coast Pipeline Superfund Site.

FOR THE UNITED STATES OF AMERICA

Date: 5/12/93

MYLES E. FLINT
Acting Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

Date: 5/13/93

RICHARD L. BEAL
TRIAL ATTORNEY
Environmental Enforcement Section
Environment and Natural Resources Division
301 Howard Street, Suite 870
San Francisco, California 94105

Date: 3.31.93

JOHN C. WISE
Regional Administrator, Region IX
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Date: March 29, 1993

Randa Bishlawi
Assistant Regional Counsel
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

FOR THE STATE OF CALIFORNIA

Date: 05 MAR 93

William P. Ryan
Acting Deputy Director
Department of Toxic Substances Control
400 P Street, 4th Floor
P.O. Box 806
Sacramento, California 95812-806

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Texaco, Inc., relating to the Pacific Coast Pipeline Superfund Site.

FOR TEXACO INC.

Date: FEBRUARY 23, 1993

VICE PRESIDENT

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name: Lowell N. Elsen, Esq.
Title: Assistant Secretary - Texaco Inc.
Address: 10 Universal City Plaza, Universal City, CA 91608
Tel. Number: (818) 505-3100

APPENDIX A

PACIFIC COAST PIPELINE
(TEXACO FILLMORE REFINERY)
SUPERFUND SITE

RECORD OF DECISION

U.S. EPA

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LIST OF FIGURES

LIST OF TABLES

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Pacific Coast Pipeline
Texaco Fillmore Facility
67 East Telegraph Road
Fillmore, CA

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the remedial action selected for the Pacific Coast Pipeline (also referred to as the Texaco Fillmore Facility) Site ("the Site") in the City of Fillmore, County of Ventura, California. This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (42 U.S.C.§9601 et seq.), and, to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 U.S.C.§300 et seq.). The attached Administrative Record Index (Attachment A) identifies the documents upon which the decision is based. The State of California concurs with the selected remedy.

ASSESSMENT OF THE SITE

If the actual or threatened releases of hazardous substances from the Site are not addressed by implementing the remedial response action selected in this ROD, the Site may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

EPA has selected Alternative 6 as the remedy for the Pacific Coast Pipeline Site. The selected remedy for contaminated ground water at the Pacific Coast Pipeline Site consists of:

1) Design, construction and operation of a ground water extraction and treatment system to treat extracted ground water to levels that meet the cleanup standards set forth in this ROD;

2) Discharge of treated ground water to the aquifer at the Site by injection or provision of the treated ground water to beneficial users of the treated ground water;

3) Soil Vapor Extraction for those areas that threaten to contaminate ground water at levels above Site cleanup standards following a one year subsurface study;

4) Ground water monitoring to demonstrate that the extraction system is effectively capturing the contaminant plume and ultimately, to demonstrate achievement of the cleanup standards throughout the aquifer; and

5) Maintenance of perimeter fencing at the Site until cleanup standards are met.

Implementation of this remedy will prevent the spread of ground water contamination and reduce the principal risk of exposure to contaminated ground water. The ground water extraction and treatment system will operate until the cleanup standards are achieved through the aquifer. Because this remedy will not result in hazardous substances remaining on the site above health-based levels, the five-year review will not apply to this action. The selected remedy will undergo periodic performance evaluations at a frequency to be determined in the Remedial Design Workplan.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate for the remedial action, and is cost-effective. This remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment to reduce toxicity, mobility, or volume as a primary element.

March 31, 1992

Daniel W. McGovern
Regional Administrator

Date

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CONCURRENCES
PACIFIC COAST PIPELINE SITE
RECORD OF DECISION

for _____ 5/5/92
Nora McGee — Date
Assistant Regional Administrator
Office of Policy and Management

_____ _____
Nancy Marvel, Regional Counsel — Date
Office of Regional Counsel

_____ _____
Harry Seraydarian — Date
Water Management Division

CONCURRENCES
PACIFIC COAST PIPELINE SITE
RECORD OF DECISION

Nora McGee
Assistant Regional Administrator
Office of Policy and Management

Date

Nancy Marvel, Regional Counsel
Office of Regional Counsel

Date

Harry Seraydarian
Water Management Division

Date

CONCURRENCES
PACIFIC COAST PIPELINE SITE
RECORD OF DECISION

Nora McGee
Assistant Regional Administrator
Office of Policy and Management

Date

Nancy Marvel, Regional Counsel
Office of Regional Counsel

Date

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Date

DECISION SUMMARY

This Decision Summary provides an overview of the problems posed by the Pacific Coast Pipeline Site. It also includes a description of the remedial alternatives considered and the analysis of these alternatives against criteria set forth in the National Contingency Plan (NCP). This Decision Summary explains the rationale for the remedy selection and how the selected remedy satisfies the statutory requirements of CERCLA.

I. SITE LOCATION AND DESCRIPTION

A. SITE NAME AND LOCATION

Pacific Coast Pipeline
Texaco Fillmore Facility
67 East Telegraph Road
Fillmore, CA

B. SITE DESCRIPTION

The Pacific Coast Pipeline (Texaco Fillmore Facility) site (the "Site") is located in Ventura County, California, on the eastern edge of the City of Fillmore (see Figure #1). The Site address is 67 East Telegraph Road, Fillmore, California. The 20 acre Site was the location of a former Texas Company Inc. ("Texaco") petro-chemical refinery which operated from the 1920s to 1950. The Site is currently used by Texaco as a pumping station for crude oil produced in the local oil fields of Ventura County. The Site is located just north of State Highway 126, which runs in an east to west direction between U.S. highways 101 and 5.

C. LAND AND WATER USE

Along the western boundary of the Site are residential homes and San Cayetano Elementary School. To the north and east of the Site is vacant land with some agricultural use. Industrial and residential properties are located to the south of the Site. To the southwest of the Site is a gas station that removed leaking fuel tanks in 1989.

Private agricultural, industrial and residential ground water supply wells exist within a half mile radius of the Site. An onsite production well is used to irrigate the orchards on a hill to the east of the Site. City of Fillmore municipal wells are located to the southwest of the Site. These wells are planned for use by the City of Fillmore.

The Site surface structures include large holding tanks, piping and a small operations building. There are no wetlands on or near the Site.

D. REGIONAL TOPOGRAPHY

The Site is located between the Topa Topa Mountains to the northwest and the Fillmore ground water basin to the southwest. Site elevations range between 480 to 625 feet above mean sea level. The

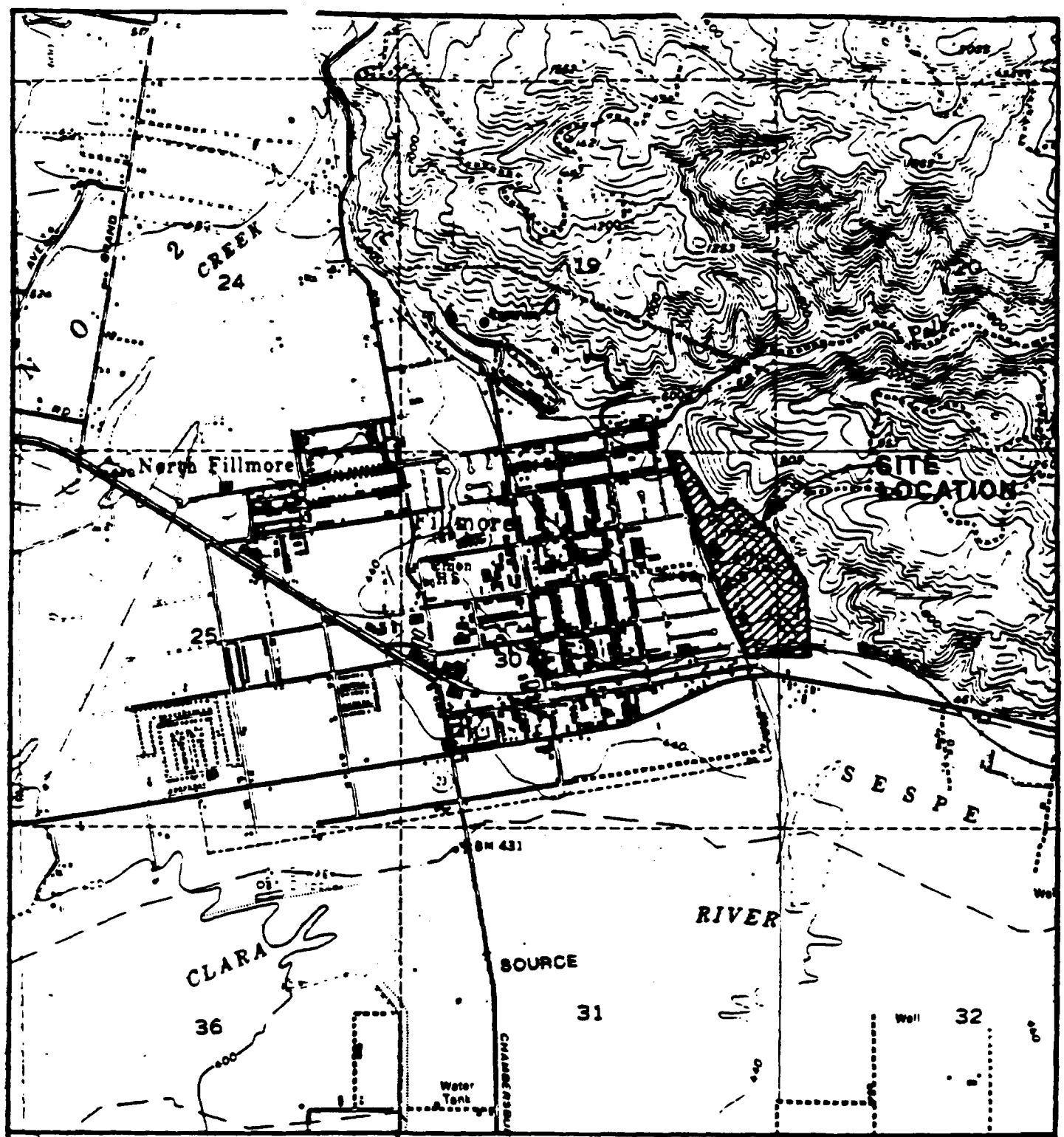

FIGURE 1
SITE LOCATION MAP
TEXACO FILLMORE FACILITY
VENTURA COUNTY, CALIFORNIA

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Santa Clara River is approximately one half mile to the south of the Site. The Site slopes generally to the south and west toward the Santa Clara River and is bordered on the west by Pole Creek, the natural surface water drainage system in the immediate vicinity of the facility. The average topographic gradient is above 0.05 foot per foot.

The Site is located near the confluence of three major drainages: the Santa Clara River, Sespe Creek and Pole Creek. Pole Creek emptied directly into the Site prior to the construction of a flood control channel. Water in the Pole Creek Flood Control Channel discharges into the Santa Clara River. Surface water from the Site is either channeled along graded roads for collection in bermed storage areas or in excavated pits, or it flows into Pole Creek either over the ground's surface or through drainage pipes.

The San Cayetano Thrust Fault that crosses the Site is associated with areas of natural oil seeps. Fractures associated with folding and fault zones can act as either seals or conduits for the migration of fluids.

E. HYDROLOGY

The Site lies at the eastern end of the Fillmore ground water basin. The Fillmore basin, the Piru basin and the Santa Clara River Valley sediments form a large connected ground water system. The ground water gradient slopes down toward the west with local variations reflecting irregularities along the boundaries of the basin. At the Site, the Fillmore basin suddenly widens and the regional ground water gradient turns towards the northwest on the north side of the Santa Clara River Valley. In the vicinity of the Site, the gradient is estimated to be approximately 35-ft per mile (0.66-foot per 100 feet) toward the west.

Geologic Units

The most correlative single soil unit at the Site is a fine-grained unit that occurs at a depth ranging from 40 to 60 feet below grade. This unit is approximately one to five feet thick and has acted as a vertical barrier to water migration in scattered locations.

Another soil horizon with properties similar to the shallow fine-grained unit appears at a depth of approximately 135 to 140 feet below grade. The textural properties and fine-grained composition of this unit appear to make it an impediment to fluid migration. It serves as a substantial confining layer to aquifers penetrated in at least eight deep monitoring wells. In each of these wells, ground water was initially encountered at an elevation near 380 to 385 feet above mean sea level (msl). Subsequently, the water elevation rose in the wells to approximately 395 feet above msl. The thickness of this soil unit varies between one to 20 feet throughout the Site with the greatest thickness to the north of the Site and in the vicinity of the main waste pit.

Ground Water

Three possible hydrogeologic units were identified during the Remedial Investigation. From the surface down they are as follows:

- A perched zone generally shallower than 40 to 50 feet below grade;

- Aquifer 1, is unconfined and found between 80 to 100 feet below grade; and

- Aquifer 2, is confined and found generally 100 feet below grade.

The base of Aquifer 1 is formed by the unit described as the deep fine-grained unit. Ground water in this unit flows in a westerly or northwesterly direction. Aquifer 2 appears to be confined beneath the same deep fine-grained unit, which is described above. Ground water in this unit flows in a northwesterly direction. There appears to be some vertical migration of ground water down from Aquifer 1 to Aquifer 2 in the southern portion of the Site where the deep fine-grained soil unit is thinnest.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Texaco operated a petroleum refinery at the Site from 1928 to 1950. The primary products of the Texaco refinery were gasoline, diesel and fuel oil. Wastes from the refinery process are believed to have consisted primarily of tank bottoms, filter clays, and sludges.

These refinery wastes were disposed of onsite from 1928 to 1950 in a large main waste pit (MWP) located on the western border of the Site, and in eight smaller unlined sumps and pits located throughout the Site. In 1950, Texaco dismantled and converted the refinery to a crude oil pumping station. It is believed that the onsite refinery wastes disposal areas were not used since 1950.

In 1986, under the guidance of the California Department of Toxic Substances Control (CA DTSC), Texaco removed 33,000 cubic yards of waste material and contaminated soils from the MWP and eight other waste disposal areas. These areas contained contaminants at concentrations considered to be hazardous substances (DHS Criteria). The contaminants found in the MWP are listed in Table A.

Texaco installed a total of 17 ground water monitoring wells between 1983 and 1988 voluntarily and at the direction of the CA DTSC. These wells indicated that ground water at the Site has been contaminated with a variety of petroleum refining waste contaminants.

In June of 1988, the Site was proposed for the National Priorities List (NPL) and final listing occurred in September of 1989. EPA conducted a Potential Responsible Party ("PRP") Search in 1989.

EPA issued a Special Notice Letter to Texaco on June 26, 1989. EPA and Texaco signed an Administrative Order on Consent (AOC) for the Remedial Investigation and Feasibility Study ("RI/FS") in October 1989. This agreement required Texaco to conduct the RI/FS at the Site under EPA's oversight.

For the next two and one-half years investigations were conducted by Texaco until sufficient information was gathered to propose a remedy. The Feasibility Study which resulted in the seven remedial action alternatives discussed in detail below was completed in February 1992.

III. HIGHLIGHTS OF COMMUNITY INVOLVEMENT

The Community Relations Plan (CRP) was completed in August 1989 by EPA Community

TABLE A

Maximum Recorded Concentrations of Hazardous and Other Substances From Excavated Main Waste Pit Material

Compounds	Maximum Concentration (ppm)
Arsenic (As)	19.0
Barium (Ba)	140.0
Cadmium (Cd)	11.0
Chromium (Cr)	120.0
Lead (Pb)	3,700.0
Mercury (Hg)	None Detected
Selenium (Se)	1.2
Silver (Ag)	None Detected
Benzene	9.3
Toluene	16.0
Ethylbenzene	10.0
Alcohols[a]	200.0
Ketones[a]	100.0
Aliphatic and Alicyclic Hydrocarbons[a]	450.0
Aromatic Hydrocarbons[a]	140.0
Alkene and Alkyne Hydrocarbons[a]	120.0

[a] Individual compounds combined and reported in their major hydrocarbon groups.

Relations staff, following EPA guidance. Development of the CRP was based on a series of informational interviews with members of the community. Consistent with the recommendations of the CRP, the EPA Project Manager, communicated regularly with the parties that had expressed a high degree of concern regarding Site activities and provided general fact sheets to the community to notify them of major milestone events.

In November 1989, EPA issued a Fact Sheet to the community of Fillmore to announce the signing of the AOC for the RI/FS with Texaco. Shortly after, the EPA project manager presented the project RI/FS workplan to the Fillmore City Council and the teachers and staff of San Cayetano School. The San Cayetano School is located directly on the western border of the property. The EPA project manager met again with the teachers and staff of the school in April 1990. In July 1990, EPA issued a second Fact Sheet and later in September met with parents of students at the school. A tour of the Site for the press and other interested community members was conducted by the EPA project manager in July 1990.

In December 1990, a third Fact Sheet was issued by EPA to announce the preliminary results of the Remedial Investigation. No responses were received following the distribution of this Fact Sheet.

In addition to efforts to provide information on the progress of the investigation to the community, a regulatory technical steering committee met regularly. The purpose of the committee has been to foster communication relating to the Site activities at all levels of government. The committee includes representatives of the City of Fillmore, the County of Ventura Environmental Health Department, California EPA Department of Toxic Substances Control and U.S. EPA. The committee met regularly throughout the Site RI/FS.

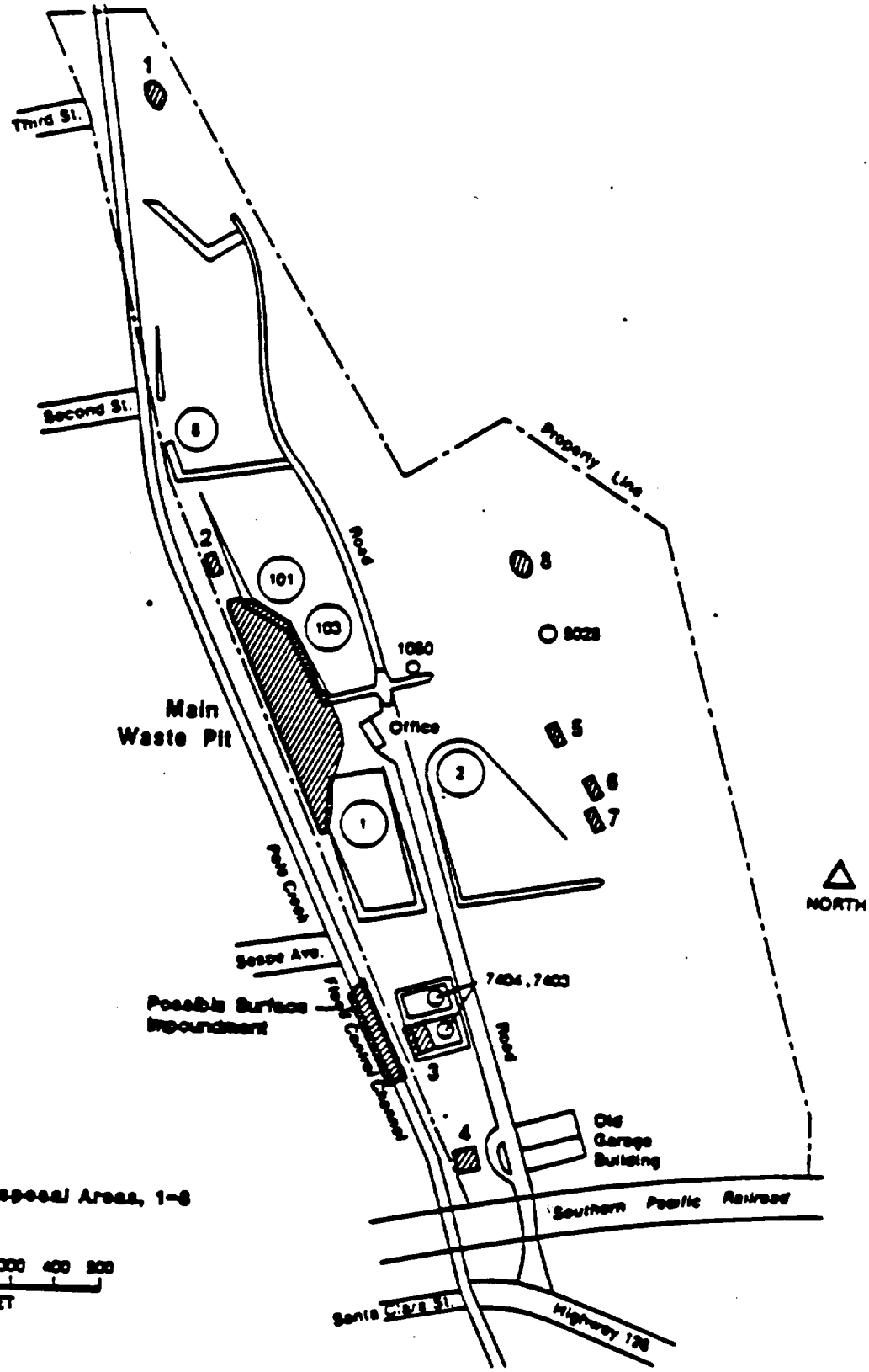
In February 1992, EPA issued a Proposed Plan outlining the remedial action alternatives for the Site. An announcement was printed in the Fillmore Gazette on February 24, 1992, announcing the Proposed Plan, public comment period and public meeting. EPA held the public meeting on March 10, 1992 at the San Cayetano Elementary School in Fillmore. The meeting was attended by 25 community members and representatives of the City government. EPA received three comment letters during the public comment period, which officially closed on March 25, 1992.

Details of community involvement activities and responses to public comments on the Administrative Record are presented in the Responsiveness Summary (Attachment B).

The public participation requirements of Sections 113(k)(2)(B)(i-v) and 117 of CERCLA have been satisfied in the remedy selection process.

IV. SCOPE AND ROLE OF THE RESPONSE ACTION

The 1986 removal of the wastes and contaminated soil from the MWP and the other eight waste disposal areas significantly reduced the amount of risk to human health and the environment at the Site. Based on the results of the Risk Assessment prepared in December 1991, the residual extent and concentration of contamination in the surface soils do not present a known significant threat to human health or the environment. However, contaminant concentrations in the ground water exceed the Federal and California standards for drinking water and may present an imminent and substantial endangerment



SOURCE: RADIAN 1984, AS PRESENTED IN FIELD SAMPLING PLAN FOR SURFACE SOILS, ENSR 1990.

FIGURE 2
LOCATIONS OF
WASTE DISPOSAL AREAS
FILLMORE FACILITY

to human health if not remediated. Therefore, remediation of the ground water is required to reduce contaminant concentrations in the ground water.

V. SUMMARY OF SITE CHARACTERISTICS

A Remedial Investigation was conducted between December 1989 and February 1992. The investigation program consisted of sampling programs to: (1) characterize known onsite areas where hazardous substances were disposed of in the past and (2) screen for the presence of contaminants that may have migrated or are migrating from the Site. The screening program included sampling and analysis of soil gas, stream sediment, surface water, and ambient air sampling. The sampling program to characterize known areas of contaminant disposal included surface soil, sub-surface soil and ground water sampling.

A. SURFACE SOILS

Historical layouts and early Site investigation work provided a foundation for design of the surface soil sampling program. The program was designed to provide a site-wide survey of possible surface soil contamination.

A total of 36 surface soil samples were collected at the Site during the Remedial Investigation. Surface soil sampling was conducted within 250 foot by 250 foot grids. Sample results indicated that in areas of known and suspected past refinery waste disposal, volatile organic compounds (VOCs) ranged from not-detectable to low-concentrations. In these same areas, semi-volatile organic compounds (SVOCs) ranged from non-detect to concentrations in the hundred parts per billion (ppb) range for select poly-aromatic hydrocarbons (PAHs), such as Chrysene. Figure #2 indicates the known and suspected waste disposal areas.

Concentrations of metals throughout the Site are presently consistent with background samples.

B. SUB-SURFACE SOIL

The extent of sub-surface soil contamination was established from the analysis of 785 samples from 78 exploratory boreholes drilled in known and suspected waste disposal areas and in uncontaminated areas to provide a bench-mark for natural Site conditions. The following section is a description of the contaminants discovered during the Remedial Investigation.

Total Petroleum Hydrocarbons (TPH) and Tentatively Identified Compounds (TIC)

TPH was found throughout the Site, however high concentrations were predominantly in the MWP and southwestern portion of the Site, corresponding with the areas of ground water contamination. TIC were detected in prior disposal areas at the Site. TPH and TIC are not known to be of concern to human health however.

Volatile Organic Compounds (VOCs)

Toxicity Characteristics Leaching Procedure (TCLP) for VOCs was conducted on approximately

142 samples. Benzene was detected in 15 of 142 samples and was generally present in subsurface soils below 11 ppb with a maximum concentration of 38 ppb. Ethylbenzene was detected in 42 of the samples with concentrations ranging from non-detectable ("ND") to a maximum of 260 ppb. Toluene was detected in 49 samples at concentrations ranging from ND to a maximum of 300 ppb. Xylenes were detected in 58 samples ranging in concentration from ND to 860 ppb. Four other VOCs were detected in sub-surface soils. However, they were only detected in one to two samples each and at low concentrations.

Given the age of the facility and the 1986 removal of the refinery wastes from the waste disposal areas, it appears that the majority of VOCs in the subsurface soils have either migrated to ground water, volatilized dispersing laterally and vertically, or degraded through natural processes.

Semi-Volatile Compounds (SVOCs)

The primary SVOCs detected included 2-Methylnaphthalene and Naphthalene. 2-Methylnapthalene was detected in 34 of the 154 samples with reported results ranging from 10 ppb to 160 ppb. Napthalene was detected in 60 samples at concentrations ranging from 10 to 160 ppb.

Metals

Metals concentrations presently in sub-surface soils were found to be consistent with background levels for the Site and for the region.

SUMMARY

The lateral and vertical distribution of VOCs and the range of VOC concentrations detected in sub-surface soils do not indicate the presence of a principal threat in soil. However, the low levels of VOCs (specifically benzene) in the vadose zone or capillary fringe may result in ongoing contamination of ground water. The investigation results indicate that studies must be conducted to determine the need for response action in sub-surface soils in order to achieve the Site cleanup standards in ground water. Data indicate that vadose zone contamination may threaten ground water quality.

C. GROUND WATER

Ground water contamination was originally detected in 1983 with the initial installation of three monitoring wells. Water quality data from these wells indicated VOCs in the parts per million (ppm) range. Fourteen additional monitoring wells were installed by Texaco at the Site prior to EPA involvement at the Site. Between mid-1990 and mid-1991, 20 more monitoring wells were drilled and completed at the Site as a part of the Remedial Investigation bringing the total number of wells at the Site to 37. These 37 wells have been sampled quarterly for TPH, VOCs, SVOCs, Metals and Ethylene Dibromide (EDB).

Water quality data indicates that ground water contamination consists mainly of TPH, TIC, VOCs and SVOCs in Aquifer #1. VOCs have only been detected in Aquifer #2 in well 25D. VOC contamination in ground water consists primarily of benzene, toluene, ethylbenzene and xylenes. These

contaminants and their respective regulatory standards are presented in Table B.

SVOCs detected were generally limited to naphthalene and 2-Methylnaphthalene. However, SVOCs were infrequently detected and generally in the low (<100ppb) range. Metals did not frequently exceed background levels and, with the exception of one sample, were not detected or detected at concentrations in compliance with existing drinking water standards.

Table B

Primary VOCs in Ground Water and Cleanup Standards

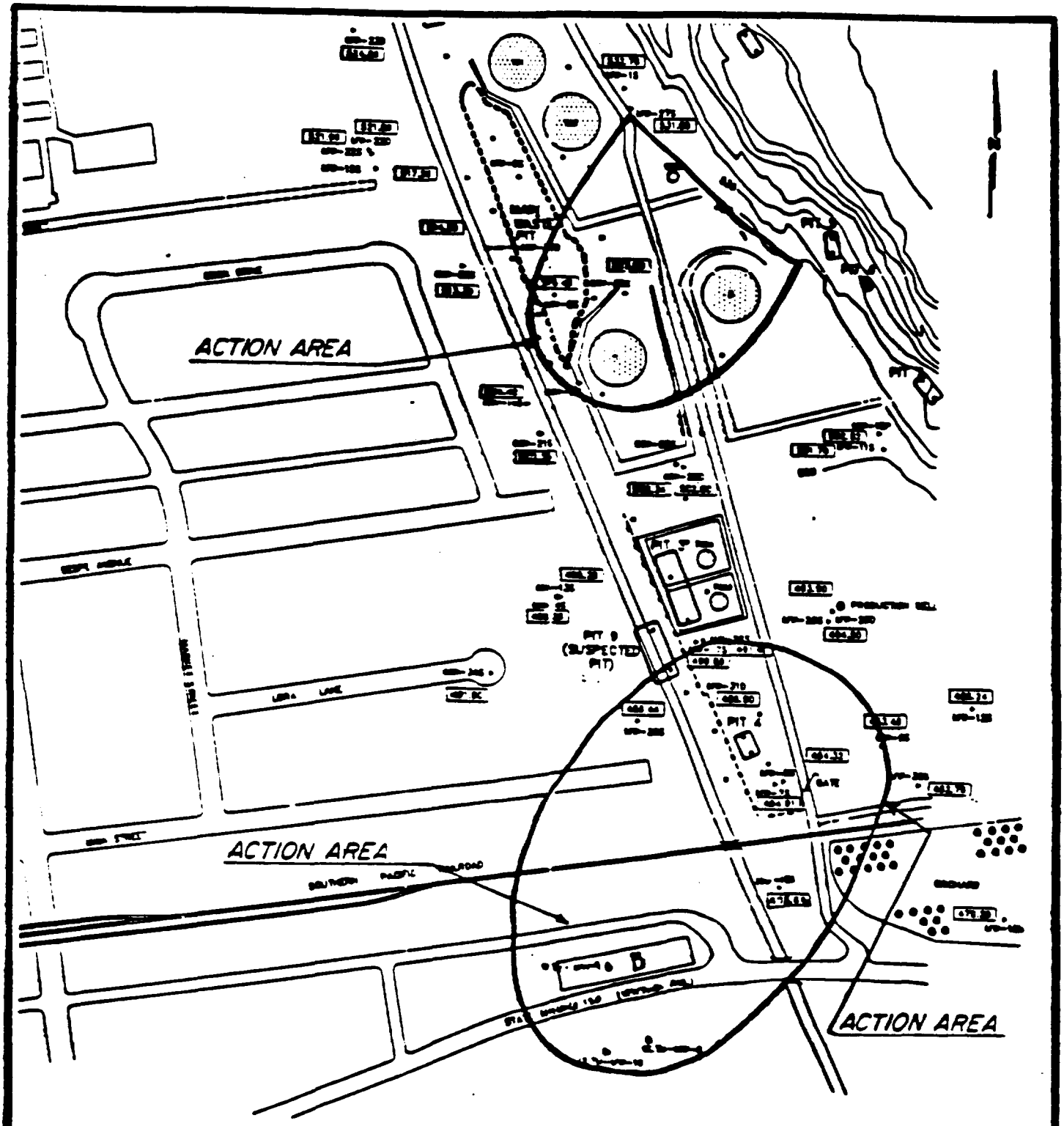
	Ground Water Quality Concentration (ppb)		Drinking Water Standards (ppb)		Clean-up Standards (ppb)
Contaminants	Minimum	Maximum	State	Federal	
Benzene	2	720	1	5	1
1,2-Dichloroethane	1	9	0.5	5	0.5
Ethylbenzene	1	150	680	700	680
Methylene chloride	6.9	56	40*	5**	5
Toluene	3	110	100*	1,000	100

**State Action Level/TBC*
***Proposed MCL/TBC*

There are currently two areas of VOC ground water contamination; one beneath the former MWP and one in the southwestern portion of the Site. The source of ground water contamination beneath the MWP is likely to have come from the refinery wastes in the MWP. The ground water contamination plume in the southern portion of the Site is likely to derive its source from suspected refinery waste pits located in the southern portion of the Site. However, the southern plume may also have been connected with sources in the northern portion of the facility given the high historical contaminant concentrations beneath the MWP. Since the removal of the refinery wastes in the MWP, concentrations of these contaminants in ground water have decreased.

A recent contour map of the ground water contamination plumes is presented in Figure 3. This presents ground water concentration contours for benzene in Aquifer #1 as described in the Site hydrology section.

Texaco sampled private production wells within a one half mile radius of the Site during the



LEGEND

——— ESTIMATED BOUNDARIES OF REMEDIATION ACTION AREAS (BASED ON 10 ppb BENZENE CONTOURS OF SECOND, THIRD AND FOURTH QUARTER 1991 GROUNDWATER MONITORING SAMPLE DATA).

NOT TO SCALE

FIGURE 3
DEFINITION OF ACTION AREAS
TEXACO FILLMORE SITE

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Remedial Investigation. Sample results indicate that no contaminants were detected.

D. SCREENING INVESTIGATIONS

A soil-gas survey was conducted. No statistical correlation was found to exist between soil-gas survey results and surface soil. However, subsurface soil data from the area of high soil gas concentrations indicate TPH, TIC and VOCs concentrations in the parts per million. However, limited TCLP data does not indicate significant leachable VOCs. It is unclear whether soil gas data indicates a potential subsurface source of leachable contaminants.

Stream sediment and surface water samples were collected from Pole Creek flood control channel and analyzed during the RI. Four sediment samples were collected, two upstream from the Site and two downstream. Eleven water quality samples were collected from seven sampling locations along Pole Creek. Samples were analyzed for metals, VOCs, SVOCs and EDB.

Stream sediment and surface water quality sampling results indicated low-levels of VOCs and SVOCs some of which may have been associated with the Site. Metals were either not detected or detected at similar concentrations in upstream samples, with the exception of a few compounds, one of which was total chromium.

Upwind and downwind ambient air samples were collected over three consecutive days. Target metal, VOCs and SVOCs in ambient air samples were either found to be below detectable limits or the upwind and downwind concentrations were determined to be insignificantly different.

E. DATA VALIDATION

Review and validation of sub-surface soils, surface soils, ground water, stream sediment and surface water, as well as equipment rinsate samples and trip blanks followed EPA Functional Guidelines.

EPA's selected 10% of the laboratory data packages for full review. The review and validation of analytical data followed EPA Functional Guidelines. A more detailed description of the data review and validation activities and results are presented in the RI Report and the Risk Assessment Report.

VI. SUMMARY OF SITE RISKS

A Risk Assessment for the Site was completed by EPA in December 1991. The purpose of the Risk Assessment was to evaluate the public health and environmental risks posed by VOCs and other contaminants detected in the different media at the Site.

There were forty five (45) chemicals of potential concern detected at the Site, including VOCs, SVOCs and metals. Metals in surface and subsurface soils samples were detected in concentrations similar to concentrations detected in offsite background samples. The chemicals of potential concern are presented in Table C.

Potentially exposed populations at and near the Site include current onsite workers, visitors or trespassers at the Site, and nearby offsite workers and residents. As a conservative estimate and because

Table C
Potential Compounds of Concern and Criteria for Selection
Texaco Fillmore Site

Sheet 1 of 2

Compound	Toxicity Values	Toxicity Concerns	Other Factors
Acenaphthene	a		
Benzene	b		
Benzo(a)anthracene		c	
Benzo(a)pyrene		c	
Benzo(b)fluoranthene		c	
Benzoic Acid	a		
Bis(2-ethylhexyl)phthalate	a,b		
2-Butanone (MEK)	a		
Carbon disulfide			d
Chlorobenzene	a		
2-Chlorophenol	a		
Chrysene		c	
1,2-Dibromoethane	b		
1,4-Dichlorobenzene	b		
1,2-Dichloroethane	b		
1,1-Dichloroethylene	a,b		
1,2-Dichloroethylene	a		
Dimethyl phthalate	a		
2,4-Dinitrotoluene	b		
Ethylbenzene	a		
2-Methylnaphthalene			d
Naphthalene	a		
4-Nitrophenol			d
N-nitroso-di-n-propylamine	b		
N,N-Dimethyl acetamide	--		--
Phenanthrene			d
Phenol	a		

Table C (continued)
Potential Compounds of Concern and Criteria for Selection
Texaco Fillmore Site

Sheet 2 of 2

Compound	Toxicity Values	Toxicity Concerns	Other Factors
Pyrene	a		
Styrene	a,b		
Toluene	a		
1,2,4-Trichlorobenzene	a		
1,1,1-Trichloroethane	a		
1,1,2,2-Tetrachloroethane	b		
Trichloroethylene	b		
Trichlorotrifluoroethane	–	–	d
Vinyl acetate	a		
Xylenes, total	a		
Arsenic	b		
Barium	a		
Cadmium	a,b		
Chromium	b		
Copper	a		
Lead		c	
Nickel	a		
Vanadium	a		

[a]Has a Reference Dose (RfD) (oral or inhalation) (as defined in Chapter 4, Toxicity Assessment)
[b]Has a Cancer Slope Factor (CSF) (oral or inhalation)
[c]Potential carcinogenicity
[d]Frequency of occurrence or site history

residential development is located immediately adjacent to the Site, risks for the Texaco Site have been evaluated assuming a future residential exposure scenario.

Potential exposure pathways identified in the Risk Assessment included ingestion of ground water, inhalation of VOCs from ground water, and direct contact with surface site soil. Screening level evaluations were also performed for ingestion of surface water, inhalation of VOCs in surface water, ingestion of stream sediment, and inhalation of ambient air. In addition, worker exposure to soil gas contaminants while trenching onsite was also a screening level evaluation. The exposure pathways are summarized in Table D.

Toxicity values for the chemicals of concern are presented in Table E.

The excess lifetime cancer risks assuming residential use of contaminated ground water (ingestion and inhalation) located at the Site, is estimated at 6x10-5. The major contributor to this risk was benzene with an estimated cancer risk of 5x10-5. Although the risk associated with ground water ingestion and inhalation is within the range generally considered to be acceptable by EPA [10-4 to 10-6] pursuant to the National Contingency Plan, 40 C.F.R. Sec 300.430(e)(2)(1)(A)(2), benzene and other known carcinogens are present in the ground water at levels that significantly exceed the federal and California drinking water standards for those chemicals.

Drinking water (chemical-specific) standards are health-based levels and may be used to determine whether an exposure is associated with an unacceptable risk to human health. To determine whether remediation is warranted at a site, EPA considers the results of the baseline risk assessment and compares site concentrations to chemical-specific standards to assess whether there is an unacceptable risk to human health or the environment (see OSWER Directive 9355.0-3.0, pg. 4, April 22, 1991). EPA has determined that the ground water contamination at this Site poses an unacceptable risk to human health because ground water at the Site is a potential source of drinking water and contains carcinogens that exceed federal and state drinking water standards.

The total estimated hazard index for non-carcinogens in the ground water, based on a child exposure scenario, was 5.0. The hazard index is a measure of the chemical-specific noncarcinogen risk. A hazard index of one (1.0) or more indicates a potential concern. Arsenic and cadmium in the ground water were the major contributors to the hazard index. It should be noted, however, that the concentrations of both of these compounds in the ground water are believed to be at naturally occurring levels and are in compliance with existing standards for drinking water. Therefore, EPA is not requiring any remediation of metals in the ground water. The risk calculation for ground water is summarized in Table F.

The estimated excess lifetime cancer risk for ingestion of surface soils assuming future onsite residential use is 4x10-5. The major contributor to this surface soil risk was chrysene with an estimated excess lifetime cancer risk of 1X10-5. Three additional chemicals, n-nitro-sodi-propylamine, benzo(a)pyrene, and benzo(a)flouranthene had excess lifetime cancer risks within EPA's acceptable risk range of 10-4 and 10-6. The total estimated hazard index for non-carcinogenic effects due to soil ingestion was .005. This risk calculation is summarized in Table G.

Risk estimates were conducted by EPA for exposure to ambient air, stream sediment, surface water, and soil gas to determine where other possible sources of risk might be located. Evaluations were

Table D
Exposure Scenarios and Assumptions
Baseline Risk Assessment
Texaco Fillmore Site

	Major Exposure Pathways	Exposure Scenarios	Exposure Assumptions*
Groundwater	Ingestion; Inhalation/Dermal (in-home use)	No known current use as drinking water. Private wells within 1/2 mile. Conservative assumption of future residential ingestion of groundwater based on importance of area groundwater as eventual drinking water source.	Adult: 70-kg body weight 2 liters per day ingestion Child: 10-kg body weight 1 liter per day ingestion 30-year exposure duration (except children) 350 days per year exposure frequency
Surface Water/ Sediments	Dermal Contact; Ingestion	Stream often dry; exposures of low frequency, duration, and magnitude. Channel is fenced; assume occasional trespass by children. Not a drinking water source.	Screening assessment to check detected compounds.
Surface Soils	Ingestion; Dermal Contact; Inhalation (particulates)	Only consistent, current exposures are to onsite personnel. Conservative assumption is future residential use.	Adult: 70-kg body weight 100 mg per day soil ingestion 24-year exposure duration Child: 15 kg body weight 200 mg per day soil ingestion 6-year exposure duration Total exposure (Adult+Child) = 30 yrs 350 days per year exposure frequency

Table D (continued)
Exposure Scenarios and Assumptions
Baseline Risk Assessment
Texaco Fillmore Site

Sheet 2 of 2

	Major Exposure Pathways	Exposure Scenarios	Exposure Assumptions*
Subsurface Soils	Current: Incidental Ingestion/Dermal Contact for Onsite Worker Future: Incidental Ingestion/Dermal Contact for Residential or Recreational Use	No direct exposure expected unless soils are excavated. Exposures of low frequency, duration, and magnitude.	Screening Assessment
Air	Inhalation	Exposure to residents at boundary represents realistic potential scenario.	Adult: 70-kg body weight 20 m^3/day inhalation Child: 10-kg body weight 5 m^3/day inhalation 30-year exposure duration (except children) 350 days per year exposure frequency
Soil-Gas	None	No direct exposure expected except as compounds move into ambient air. Important as evidence of continuing sources and site-specificity of contaminants. Conservative assumptions of worker in trench.	Workers: 8 hours per day 20 m^3/day inhalation 25-year exposure duration 250 days per year exposure frequency

*From EPA, 1980, 1989 and 1990a

Table E
Selected Toxicity Values for Compounds of Concern
Texaco Fillmore Site

Compound	Oral RfD(mg/kg/d)	Inhalation RfD(mg/kg/d)	Weight of Evidence	Oral CSF(kg-d/mg)	Inhalation UR(/ug/m^3)	Inhalation CSF (kg-d/mg)
Acenapthene	0.06	--	--	--	--	--
Benzene	--	--	A	0.029	8.3E-06	0.029
Benzo(a)anthracene	--	--	B2	11.5[b]	1.7E-03[b]	6.1[b]
Benzo(a)pyrene	--	--	B2	11.5[a]	1.7E-3[a]	6.1[a]
Benzo(b)fluoranthene	--	--	B2	11.5[b]	1.7-E-03[b]	6.1[b]
Benzoic Acid	4.0	--	D	--	--	--
Bis(2-ethylhexyl) phthalate	0.02[a]	--	B2	0.014[a]	--	--
2-Butanone (MEK)	0.05	0.09[a]	D	--	--	--
Carbon disulfide	0.1	0.003[c]	--	--	--	--
Chlorobenzene	0.02	0.005[a]	D	--	--	--
2-Chlorophenol	0.005	--	--	--	--	
Chrysene	--	--	B2	11.5[b]	1.75-03[b]	6.1[b]
1,2-Dibromoethane (EDB)	--	--	B2	85[a]	2.2E-04[a]	0.76
1,4-Dichlorobenzene	--	0.2[c]	--	0.024	--	--
1,2-Dichloroethane	--	--	B2	0.091	2.6E-05	0.091
1,1-Dichloroethylene	0.009	--	C	0.6	6E-05	1.2

Table E (continued)
Selected Toxicity Values for Compounds of Concern
Texaco Fillmore Site

Compound	Oral RfD(mg/kg/d)	Inhalation RfD(mg/kg/d)	Weight of Evidence	Oral CSF(kg-d/mg)	Inhalation UR(/ug/m^3)	Inhalation CSF (kg-d/mg)
Cis 1,2-Dichloroethylene	0.01[a]	--	D	--	--	--
trans 1,2-Dichloroethylene	0.02	--	--	--	--	--
Dimethyl phthalate	1.0[a]	--	D	--	--	--
2,4-Dinitrotoluene	--	--	B2[a]	0.68[a]	--	--
Ethylbenzene	0.1	0.286[ac]	D	--	--	--
2-Methylnaphthalene	--	--	--	--	--	--
Naphthalene	0.004[a]	--	--	--	--	--
4-Nitrophenol	--	--	--	--	--	--
N-nitroso-di-n-propylamine	--	--	B2	7.0	--	--
N,N-Dimethyl acetamide	--	--	--	--	--	--
Phenanthrene	--	--	D	--	--	--
Phenol	0.6	--	D	--	--	--
Pyrene	0.03[a]	--	--	--	--	--

Table E(continued)
Selected Toxicity Values for Compounds of Concern
Texaco Fillmore Site

Compound	Oral RfD(mg/kg/d)	Inhalation RfD(mg/kg/d)	Weight of Evidence	Oral CSF(kg-d/mg)	Inhalation UR(/ug/m^3)	Inhalation CSF (kg-d/mg)
Styrene	0.2	--	B2	0.03[a]	5.7E-07[a]	0.002[a]
Toluene	0.2	0.572[c]	D	--	--	--
1,1,1-Trichloroethane	0.09	0.3[a]	D	--	--	--
1,1,2,2-Tetrachloroethane	--	--	C	0.2	5.8E-05	0.2[a]
Trichloroethylene	--	--	B2[a]	0.011[a]	1.7E-06[a]	0.017[a]
1,1,2-Trichloro-1,2,2-trifluoroethane	30	7.7[c]	--	--	--	--
Vinyl acetate	1.0[a]	0.057[c]	--	--	--	--
Xylenes, total	2	0.086[c]	D	--	--	--
Arsenic	0.001[a]	--	A	--[d]	4.53E-03	50
Barium	0.07	0.0001[a]	--	--	--	--
Cadmium	0.0005[e] 0.001[f]	--	B1	--	1.8E-03[a]	6.1
Chromium III	1	5.7E-07[c]	--	--	--	--
Chromium VI	0.005	5.7E-07[c]	A	--	1.2E-02	41
Copper	--	--	D	--	--	--

Table E (continued)
Selected Toxicity Values for Compounds of Concern
Texaco Fillmore Site

Sheet 4 of 4

Compound	Oral RfD(mg/kg/d)	Inhalation RfD(mg/kg/d)	Weight of Evidence	Oral CSF(kg-d/mg)	Inhalation UR(/ug/m^3)	Inhalation CSF (kg-d/mg)
Lead	--	--	B2	--	--	--
Nickel	0.02	--	--	--	--	--
Vanadium	0.007	--	--	--	--	--

Notes:
Source of Toxicity Values = IRIS 1991, unless noted.
[a]From HEAST, Annual FY1991
Oral RfD = Oral Reference Dose
Inh RfD = Inhalation Reference Dose
Oral CSF = Oral Cancer Slope Factor
Inh UR = Inhalation Unit Risk
Inh CSF = Inhalation Cancer Slope Factor
CA Weight-of-Evidence Classifications:
A Human carcinogen
B1 Probable human carcinogen, limited human data
B2 Probable human carcinogen, adequate animal evidence and inadequate or no human data
C Possible human carcinogen
D Not classified as to human carcinogenicity
"--" = Not available or not applicable
[b]Toxicity assumed equal to benzo(a)pyrene. Based on U.S. EPA policy (Memo from Pei-Fung Hurst/U.S. EPA Coordinator, Superfund Technology Support center, to Dana Davoli/U.S. EPA Region IX, September 18, 1990.
[c]Backcalculated from HEAST value in mg/m^3 using 20 m^3 inhalation rate and 70 kg body weight.
[d]Unit risk of 5E-05 (ug/L) proposed (IRIS, February, 1991).
[e]Water
[f]Food

based on conservative exposure assumptions using the highest concentration detected for each contaminant. Evaluations for ambient air, stream sediment, and surface water are based on a future onsite residential scenario. Evaluations for soil gas were based on the scenario of a worker excavating onsite soils.

The estimated excess lifetime cancer risk due to inhalation of chemicals detected in the ambient air was 4x10-5. The estimated hazard index for this pathway is .08. The estimated excess lifetime cancer risk due to ingestion and inhalation of chemicals detected in surface water was 5x10-6, while the risk due to ingestion of chemicals detected in stream sediment was 2x10-6. The hazard indices for both scenarios were less than one. The risks for both scenarios are within EPA's acceptable risk range of 10-4 and 10-6.

The estimated excess lifetime cancer risk for worker exposure to soil gas while trenching was 4x10-3. This initial onsite worker calculation was a conservative estimate. A more realistic recalculation would likely fall within the EPA acceptable risk range. However, additional characterization of soil gases is required.

ENVIRONMENTAL RISK

In the qualitative environmental assessment portion of the Risk Assessment, information was collected regarding the sensitive species and habitats in the area. Nine birds and seven mammals were identified as special status species potentially occurring in the vicinity of the Site. Potential exposure pathways include direct contact with detected chemicals in surface soils, surface water, and creek sediment.

Pole Creek flows into the Pole Creek Flood Control Channel along the western border of the Site and eventually to the Santa Clara River. Chemical concentrations detected in Pole Creek were compared to regulatory criteria for the protection of freshwater aquatic life. All chemicals with criteria were detected at concentrations below the corresponding criteria for the protection of aquatic species.

SUMMARY

Releases of hazardous substances from the Site have resulted in the contamination of ground water presenting an imminent and substantial endangerment to public health, welfare or the environment if the releases from the Site are not addressed by implementing the remedial response action selected in this ROD. Interim removal of the refinery wastes in the MWP and other areas has significantly reduced Site risks. However, ground water contamination beneath the Site still exceeds drinking water standards and requires remedial action.

VII. DESCRIPTION OF ALTERNATIVES

This section will describe seven alternatives that EPA has evaluated in selecting the final cleanup plan for the Site. The seven alternatives were evaluated and compared to the nine criteria required by the NCP (40 CFR Sec. 300.430(e)(9)) in the Feasibility Study. The nine criteria are: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements (ARARS); long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short term effectiveness; implementation; cost; state acceptance; and community

Table F
Risk Characterization for Groundwater
Texaco Fillmore Site

		Onsite Residential Scenario Excess Lifetime Cancer Risk			Child Residential Scenario Noncarcinogenic Hazard Quotients		
Compound[a]	Groundwater Concentration[b] (mg/l)	Ingestion	Inhalation	TOTAL	Ingestion	Inhalation	TOTAL
Benzene (A)	0.071	2.4E-05[c]	2.4E-05	4.8E-05	--	--	--
Carbon disulfide	0.0032	--	--	--	0.0031	0.10	0.10
Chlorobenzene	0.001	--	--	--	0.0048	0.019	0.024
1,2-Dichloromethane (B2)	0.0021	2.2E-06	2.2E-06	4.4E-06	--	--	--
Ethylbenzene (D)	0.01	--	--	--	0.01	0.0034	0.013
2-Butanone (MEK) (D)	0.018	--	--	--	0.034	0.019	0.053
Naphthalene	0.011	--	--	--	0.26	--	0.26
2-Methylnaphthalene	0.0073	--	--	--	--	--	--
1,1,2,2-Tetrachloromethane (C)	0.001	2.3E-06	2.3E-06	4.6E-06	--	--	--
Toluene (D)	0.015	--	--	--	0.0072	0.0025	0.0097
Xylenes (D)	0.01	--	--	--	0.00048	0.011	0.011
Arsenic (A)	0.018	--	NC	--	1.7	NC	1.7
Barium	0.324	--	NC	--	0.44	NC	0.44
Cadmium (B1)	0.0048	--	NC	--	0.92	NC	0.92
Chromium	0.015	--	NC	--	0.0014	NC	0.0014

Table F (continued)
Risk Characterization for Groundwater
Texaco Fillmore Site

Compound[a]	Groundwater Concentration[b] (mg/l)	Onsite Residential Scenario Excess Lifetime Cancer Risk			Child Residential Scenario Noncarcinogenic Hazard Quotients		
		Ingestion	Inhalation	TOTAL	Ingestion	Inhalation	TOTAL
Chromium VI	0.02	--	NC	--	0.38	NC	0.38
Copper	0.022	--	NC	--	--	NC	--
Lead (B2)	0.0029	--	NC	--	--	NC	--
Nickel	0.04	--	NC	--	0.19	NC	0.19
Vanadium	0.032	--	NC	--	0.44	NC	0.44
TOTALS		3E-05	3E-05	6E-05	4.4	0.2	5

[a]Letters in parentheses are carcinogenic weight-of-evidence classifications.
[b]95% upper confidence limit of the mean or the maximum detected value, whichever is lower (from Table 1-3).
[c]9.7E-05 = 9.7×10^{-5}
--No toxicity value available.
NC = Not calculated

Table G
Risk Characterization for Surface Soils
Texaco Fillmore Site

Compound	Conc[a] (µg/kg)	Excess Lifetime Cancer Risk Ingestion	Noncarcinogenic Hazard Quotients Child/Ingestion
Acenaphthene	1169	–	2.49E-04
Benzene (A)[b]	10.9	4.95E-10	–
Benzo(a)anthracene (B2)	61	1.10-06	–
Benzo(a)pyrene (B2)	250	4.50E-06	–
Benzo(b)fluoranthene (B2)	93	1.62E-06	–
Bis(2-ethylhexyl)phthalate (B2)	890	1.95E-08	5.69E-04
2-Butanone (MEK) (D)	19.6	–	5.01E-06
Chlorobenzene (D)	7.61	–	.4.86E-06
2-Chlorophenol	1263	–	3.23E-03
Chrysene (B2)	800	1.44E-05	–
1,2-Dibromoethane (B2)	3.22	4.28E-07	–
1,4-Dichlorobenzene	1162	4.37E-08	–
1,1-Dichloroethylene	6.45	6.06E-09	9.16E-06
2,4-Dinitrotoluene (B2)	1181	1.26E-06	–
Ethylbenzene (D)	4.67	–	5.97E-07
4-Nitrophenol	5591	–	–
N-nitrosodi-n-propylamine (B2)	1178	1.29E-05	–
Phenanthrene (D)	110	–	–
Phenol (D)	1220	–	2.60E-05
Pyrene	1177	–	5.02E-04
Toluene (D)	173	–	1.11E-05
1,1,1-Trichloroethane (D)	4.7	–	6.68E-07
Trichloroethylene (B2)	6.99	1.20E-10	–
Vinyl acetate	15.3	–	1.96E-07
Xylenes (Total) (D)	9.69	–	6.19E-08
TOTALS		4E-05	0.005

[a]Ninety-five percent upper confidence limit on the mean (from Table 2-2).
[b]Letters in parentheses are carcinogenic weight-of-evidence classifications.

acceptance. The nine criteria are described in more complete detail in Part VIII of this decision document, entitled Summary of Comparative Analysis of Alternatives.

The focus of the Feasibility Study was the achievement of drinking water standards in ground water. The aquifers at the Site are designated by the State of California as potential sources of drinking water and therefore must be restored to drinking water quality standards. The federal and state drinking water standards for the compounds of concern are presented in Table B. The alternatives described below, except the no-action alternative, are designed to meet these standards in the aquifer over different restoration time periods, employing different treatment technologies.

Each alternative would require periodic ground water monitoring to determine the effectiveness of the cleanup and to verify achievement of the cleanup standards. The specific ground water monitoring program will be defined more precisely during Remedial Design/Remedial Action.

A. ALTERNATIVE 1

The NCP requires that a no-action alternative be considered at every site. The no-action alternative serves primarily as a point of comparison to other alternatives. There are no costs associated with this alternative. No active treatment systems exist at the site and none would be implemented in this alternative.

B. ALTERNATIVE 2

Remedial Alternative 2 consists of continuing (1) existing restrictions to access to the Site by maintaining perimeter fencing until the cleanup standards are achieved and (2) ground water monitoring presently performed at the Site. However, no action would be taken to remove contamination from the ground water or soils.

There would be a capital cost of $55,000 for this alternative. The annual operation and maintenance costs for Alternative #2 would be $120,000. Net present value for this alternative would range between $500,000 and $1,500,000. Cleanup time frames are presented as a range to account for the variable influence that natural degradation may have on the time it takes to achieve the cleanup standards in groundwater.

C. ALTERNATIVE 3

Alternative 3 would involve continuing the activities described in Alternative 2 plus the installation of caps or covers over the waste pit areas to inhibit leachate migration from the soils to ground water. However, no action would be taken to remove the contaminants from the ground water or soils or to prevent the migration of ground water contamination.

Capping the waste pit areas would involve importing native fill from other locations at the Site, combining the fill with clay, and covering the waste pit with this mixed material. Capping with a synthetic cover would involve installing the cover over the area and capping it with imported fill from other locations at the Site. Both scenarios would involve final surface grading and revegatation to control surface drainage.

There would be a capital cost of $970,000 for this alternative which includes maintaining the existing perimeter fencing and quarterly ground water monitoring. The annual operation and maintenance costs for Alternative 3 would be approximately $140,000. Likely net present value would range between $1,600,000 and $2,700,000.

D. ALTERNATIVE 4

Remedial Alternative 4 includes: (1) continuing maintenance of perimeter fencing, (2) quarterly ground water monitoring that is currently conducted at the Site and (3) a ground water extraction and surface treatment system. No action would be taken to prevent or inhibit the migration of low levels of leachable contaminants from the subsurface soils to the ground water under this alternative.

Under this alternative the ground water extraction system would consist of a set of recovery wells strategically situated within both areas of ground water contamination. The placement and number of wells will be determined by EPA once aquifer testing and ground water modeling has been completed. Preliminary conceptual design work indicates that somewhere between four to seven extraction wells may be required for the ground water system.

The extracted ground water will be treated at the surface using carbon adsorption. Carbon adsorption was selected as the most cost effective and implementable treatment system in the Feasibility Study. Carbon adsorption is a physical process in which materials are transferred from the aqueous phase to the surface of a solid (carbon), where they are concentrated. Granular activated carbon (GAC) is the most common adsorbent used in water and waste water treatment. The internal pore structure provides a large surface area for adsorption of different organic compounds.

The carbon after use needs to be replaced or regenerated. Regeneration and or replacement of the carbon constitutes the majority of the operation costs associated with carbon adsorption. The specific design of the GAC system will be determined during the remedial design phase. Spent carbon will be thermally destroyed or regenerated.

Treated ground water will be injected into the aquifer or reused in a beneficial manner such as irrigation.

There would be a capital cost of $550,000 for this alternative. The annual operation and maintenance costs for Alternative 4 would be $240,000. Net present value for this alternative ranges from $1,200,000 to $3,500,000.

E. ALTERNATIVE 5

Remedial Alternative 5 would include an in-situ bioremediation system to cleanup ground water. In-situ bio-remediation consists of enhancing environmental conditions in the subsurface where contaminants are present to optimize natural microbial metabolism of organic compounds. The conceptual layout of the system includes: (1) extraction of ground water from the areas with contaminated ground water, (2) surface treatment of the extracted groundwater with activated carbon to remove residual constituents, (3) addition of oxygen and nutrients to the treated ground water: and (4) re-infiltration of the enhanced water through the vadose zone soils to the ground water.

The system would require the use of extraction wells, infiltration galleries, and injection wells. Maintenance of the perimeter fencing and quarterly ground water monitoring would be continued under this alternative.

Laboratory or field studies are usually required to determine biodegradation rates, oxygen and nutrient requirements, and effects of different parameters such as pH and temperature on bio-degradation. Once implemented, bio-remediation systems require significant operational efforts to monitor and maintain optimum conditions for microbial growth, and to prevent fouling or plugging that may render the system ineffective.

The total capital cost associated with this alternative is approximately $790,000. The annual operation and maintenance costs are estimated at $300,000. The estimated net present value for this alternative ranges between $1,300,000 and $4,500,000, depending upon the rate of natural degradation that may be occurring at the Site.

F. ALTERNATIVE 6

Alternative 6 consists of the ground water extraction and carbon treatment described in Alternative 4, plus soil treatment by soil vapor extraction (SVE). Maintenance of the perimeter fence and periodic ground water monitoring would be required. Treated ground water will be injected into the aquifer or reused in a beneficial manner such as irrigation.

The remedial action objective for SVE would be to remove the potential for continued ground water contamination due to migration of contamination from the vadose zone. The criteria for the need to conduct the SVE and the extent of such an action would be triggered by a residual distribution and mass of VOCs in the vadose zone that threatens to contaminate underlying ground water at levels exceeding federal or state drinking water standards (Maximum Contaminant Levels, or MCLs) selected in this ROD. The distribution and mass of residual VOCs would be evaluated at regular intervals throughout operation and/or monitoring of the SVE system.

SVE removes contaminants in the vapor phase from pore spaces in the unsaturated zone by drawing air through the subsurface. This is accomplished by installing and drawing a vacuum on vapor recovery wells. The flow of air through the subsurface enhances the volatilization rate of contaminants. Significant increases in the subsurface biological degradation of many compounds has also been confirmed through the use of the SVE. Extracted soil vapor will be treated by vapor-phase carbon adsorption or equivalent treatment method.

Prior to initiating the design of the SVE system, a one year subsurface study will be conducted. Components of the study will include: (1) an assessment of soil parameters potentially influencing rates of natural degradation in the sub-surface soil; (2) performance of additional field work to collect data on soil vapors in target areas; (3) a calculation of sub-surface soils impact to ground water using "Designated Level Methodology" or "V-Leach" or a similar analytical tool approved by EPA; and (4) collection of additional ground water monitoring data. Values for soil, contaminant, and underlying saturated zone parameters to be used in the application the analytical tool and the mixing zone calculations shall be those selected by EPA. Following an analysis of the results of the one year subsurface study, EPA shall require SVE for those areas that threaten to contaminate groundwater at levels above site cleanup standards.

The total capital cost for this alternative is $1,075,000 or lower depending on whether an SVE is included in the alternative following the one-year soil study. Annual O&M costs would be $480,000. Net present value for the remedy would range from $2,300,000 to $7,000,000.

G. ALTERNATIVE 7

Alternative 7 would consist of the in-situ ground water treatment system as described in Alternative 5, plus soil treatment by SVE. The perimeter fencing would be maintained, and periodic ground water monitoring would be continued. The in-situ soil bioremediation system would differ from that described for Alternative 5 in that the ground water enhanced with oxygen and nutrients would be reinjected into the subsurface only through the injection well rather than through infiltration galleries. The SVE system would be similar to that described in Alternative 6.

The total estimated capital cost for this alternative is $1,270,000. Annual O&M costs, including maintaining perimeter fencing and ground water monitoring, would be $540,000. The estimated net present value for this alternative would range between $1,800,000 and $8,000,000.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

A. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Overall protection of human health and the environment addresses whether an alternative provides adequate protection from exposure to contamination and describes how risks for the exposure pathways are eliminated or reduced.

The no-action Alternative 1 would not provide any protection from exposure to ground water contamination at the Site and there would be no reduction of Site risk. Alternatives 2 and 3 would not actively eliminate or reduce risks posed by ground water contamination and could result in the contamination spreading. Ground water monitoring would measure possible natural processes such as degradation and attenuation, however, these processes are uncertain and do not provide as much protection as provided by alternatives 4, 5, 6 and 7.

Alternative 4 and 6 through the use of engineering controls in the form of a ground water extraction and treatment system would protect against the spread of contaminated ground water and reduce the risk of exposure to contaminants in ground water by the treatment of contaminants in ground water to the state or federal standard for drinking water, whichever is more stringent. Alternatives 5 and 7, would to the degree that they would be able to affect the full extent of ground water contamination down to the cleanup standards, provide protection from the migration of contaminants equal to the level provided by alternatives 4 and 6. However, in-situ systems are not as robust in capturing the full extent of ground water contamination.

B. COMPLIANCE WITH ARARS

Section 121(d) of the CERCLA, 42 U.S.C. §9621(d), requires that remedial actions selected under CERCLA attain a level or standard of control of the hazardous substances at a Site which complies with "applicable or relevant and appropriate requirements" ("ARARS") of federal environmental laws and more stringent state environmental and facility siting laws, that have been identified by the state in a timely manner.

"Applicable" requirements are those cleanup standards, standards of control, and other substantive requirements or limitations that have been promulgated under federal or state environmental and facility siting laws that specifically address a hazardous substance, pollutant or contaminant, remedial action or other circumstance at a particular CERCLA Site. "Relevant and appropriate" requirements are cleanup standards, standards of control and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not directly applicable, to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA Site, address problems or situations sufficiently similar to those encountered at the particular Site that their use is well suited to the particular Site. If an ARAR does not cover a particular situation, or if an ARAR is determined to be insufficient to protect human health or the environment, non-promulgated advisories or guidance (To Be Considered or TBCs) may be used in determining the necessary cleanup level for protection of health or the environment.

There are three categories of ARARs or TBCs: (1) contaminant-specific, (2) action-specific and (3) location-specific. Contaminant-specific ARARs and TBCs are limits on concentrations of specific hazardous substances, pollutants or contaminants in the environment. Examples of this type of requirement are drinking water standards and ambient water quality criteria. Action-specific ARARs and TBCs are restrictions that are triggered by a particular type of activity at a Site such as Resource Conservation and Recovery Act regulations regarding hazardous waste treatment, storage or disposal. The third type of ARARs or TBCs are restrictions on certain types of activities based on the location of the Site. These include restrictions on activities in wetlands, floodplains and historic areas.

Contaminant-Specific ARARs and TBCs

A total of forty five (45) contaminants were identified for evaluation in the risk assessment because they were detected at the Site. The risks from these contaminants were determined to be within EPA's acceptable risk range for all exposure pathways for all contaminants. However, four of these contaminants exceed their federal or state drinking water standards and therefore present an unnaceptable risk to human health.

The contaminant-specific ARARs for the Site are Federal and State of California drinking water standards because the Site ground water is a potential source of drinking water. The NCP (40 C.F.R. §300.430(f)(5)) requires that remedial actions attain the Maximum Contaminant Level Goal (MCLGs) established under the federal Safe Drinking Water Act that are set above zero for ground water that is a current or potential source of drinking water. If a MCLG is set at zero or is not relevant and appropriate under the circumstances, the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act will be an ARAR. The MCLs and MCLGs for the constituents of concern are set forth in Table B. EPA considers the proposed MCL for Methylene Chloride as the TBC because it is the most protective standard.

The State of California has also promulgated MCLs for the constituents of concern as shown in Table B. The California MCLs are either equal to or more stringent than the federal MCLs and MCLGs for the constituents of concern.

EPA also considered the California Department of Health Services drinking water action levels (ALs) as TBCs. ALs are health-based chemical concentrations designed to limit public exposure to substances that do not have state MCLs at this time. ALs are advisory standards that apply at the tap for public water supplies. Toluene has a California AL.

EPA has selected the California AL as the ground water cleanup standard for toluene because the federal MCLG for toluene is not as protective of ground water as the State AL. In addition, EPA has selected the proposed federal MCL, as the cleanup standard for methylene chloride because that standard is the most protective standard for the ground water. For the other contaminants, EPA has selected as the cleanup standard for ground water the current federal MCLs or federal MCLGs or state MCLs, whichever is most stringent for the particular contaminant. Table B sets forth the cleanup standards for five contaminants.

All of the alternatives could possibly achieve the chemical-specific ARARs. However, the ARARs would be achieved in varying time frames under the various alternatives. Alternatives 1 through 3 rely entirely on natural degradation of contamination and represent the alternatives least likely to achieve ARARs. Alternatives 5 and 7 would rely on certain natural conditions to enhance the rate of degradation, which are more difficult to control but would likely achieve the ARARs, particularly Alternative 7. Alternatives 4 and 6 are also likely to achieve ARARs. Without site specific results from implementation of each of the alternatives, it is very difficult to estimate any particular alternative's ability to achieve a cleanup standard as low as 1 ppb, as in the case for benzene at this Site.

Action Specific ARARs and TBCs

Injection of Treated Effluent into Aquifer

Alternatives 4, 5, 6 and 7 include ground water extraction and treatment, and possible injection of treated effluent into the ground water. Effluent from the ground water treatment system that is injected into the aquifer at the Site must meet the following ARARs: (1) the Los Angeles Regional Water Quality Control Board's Water Quality Control Plan, which incorporates State Water Resources Control Board (SWRCB) Resolution No. 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California," (2) Section 3020 of the Resource Conservation and Recovery Act, (3) the California Safe Drinking Water Act (Proposition 65), and (4) the federal Underground Injection Control (UIC) Program for class V wells set forth in 40 C.F.R. Part 144.

SWRCB Resolution #68-16 requires maintenance of existing State water quality unless it is demonstrated that a change will benefit the people of California, will not unreasonably affect present or potential uses, and will not result in water quality less than that prescribed by other State policies.

Section 3020 of the Resource Conservation and Recovery Act prohibits disposal of hazardous waste above or into a formation which contains a source of drinking water. This prohibition does not apply to injection of treated contaminated ground water into an aquifer if (1) such injection is part of a response

action under CERCLA, (2) the contaminated ground water is treated to substantially reduce hazardous substances prior to such injection, and (3) the response action will upon completion be adequate to protect human health and the environment.

Proposition 65 prohibits the discharge of chemicals known to the State to cause cancer or reproductive toxicity into ground water or surface water drinking water sources or onto land which may pass into a drinking water source. Benzene, and other constituents of concern at the Site, have been identified as carcinogens by the State of California.

The federal Underground Injection Control Program requires that injection wells such as those that would be located at the Site not, (1) cause a violation of primary MCLs in the receiving aquifer, and (2) not adversely affect the health of persons (40 C.F.R. Sec. 144.12).

To meet these ARARs, any treated ground water that is reinjected at the Site will be treated to concentrations below federal MCLs/MCLGs or State MCLs, whichever is more stringent, for all the constituents of concern, except toluene, for which the ground water must be treated to below the State AL and methylene chloride for which the ground water must be treated to below the proposed federal MCL.

Reuse of Treated Ground Water

Alternatives 4 and 6 include ground water extraction and treatment that results in treated effluent that could be reused in a beneficial manner. The action-specific ARARs or TBCs that are applicable to the use of treated ground water from the Site in a public drinking water system are (1) the State and federal drinking water standards, (2) the SWRCB's Resolution #68-16 and (3) California's Proposition 65. To meet these ARARs, any treated ground water that is delivered from the Site to public water supplies must be treated to concentrations below the State or federal MCLs, whichever is more stringent for the contaminants of concern except the ground water will have to be treated to below the California AL for toluene.

The three requirements listed above have been identified by EPA as TBCs if the ground water extracted from the Site is provided at the Site for use as non-potable water. EPA has determined that this is necessary to protect human health and the environment from the use of inadequately treated ground water. Accordingly, the ground water must be treated to below the State or Federal MCLs, whichever is more stringent for the contaminants of concern before reuse of any type.

Carbon Adsorption

Use of activated carbon for treatment of organics under alternatives 4, 5, 6, and 7 could trigger Resource Conservation and Recovery Act (RCRA) and California Hazardous Waste Control Act (HWCA) requirements for hazardous waste generators if the spent carbon contains sufficient quantities of hazardous constituents that cause the spent carbon to be classified as a characteristic hazardous waste under RCRA or HWCA. If the spent carbon is a characteristic hazardous waste under RCRA and HWCA, the ARARs for handling such waste are the requirements for hazardous waste generators set forth in 40 C.F.R. Part 262 and Part 268 and HWCA regulations at Title 22 Sections 66470-66515 and Title 22 Chapter 30, Article 15. Storage of contaminated carbon that is classified as a characteristic hazardous waste for more than 90 days triggers the hazardous waste storage requirements set forth in 40 C.F.R. Part

264 and HWCA Title 22 Sections 67180-67194.

Soil Vapor Extraction

Alternatives 6 and 7 include soil vapor extraction which may result in the release of pollutants into the air. In California, the authority to regulate stationary sources has been delegated to local air quality management districts. The Site is located within the jurisdiction of the Ventura County Air Pollution Control District (APCD). Accordingly, action-specific ARARs for emmissions from a soil vapor extraction system at the site include the substantive requirement of APCDs Rules 26.2 (New Source Review) if the emmissions are determied to be of the type and quantity to be covered by these rules.

Location-Specific ARARs and TBCs

EPA has not identified any location-specific ARARs or TBCs for the Site.

C. LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time. This criterion includes the consideration of residual risk and the adequacy and reliability of controls after implementation of the remedy. The residual risk, or risk remaining after completion of the cleanup, is the same for all of the alternatives because the cleanup standards are the same for all alternatives. The residual risk for benzene at the cleanup standard of 1 ppb is approximately 1x10-6. Other contaminants are present at concentrations that would adequately be reduced during the cleanup of benzene to 1 ppb. These other residual contaminants would not contribute additional significant residual risk.

Long-term effectiveness is also measured by the adequacy and reliability of controls. Alternatives 4 through 7 would have the greatest ability to maintain reliable protection of human health and the environment over time because active measures are used under these alternatives to control the spread of contamination and to restore the aquifer. All alternatives include ground water monitoring. Alternatives 2 and 3 have no hydraulic controls, and therefore provide the least amount of control over ground water when compared with alternatives 4 through 7. Alternatives 1 through 3 might allow contamination to spread to clean zones within the aquifers in the Fillmore basin.

D. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

Reduction of toxicity, mobility, or volume through treatment refers to the preference for a remedy that uses treatment to reduce health hazards, contaminant migration, or the quantity of contaminants at the Site.

Alternatives 1, 2 and 3 do not employ treatment and therefore provide no measurable beneficial effect for this criteria when compared with the other alternatives. Alternative 4 would reduce contaminants by extracting them from the ground water and destroying them through the regeneration of the spent carbon. Alternative 5 would provide a slightly higher degree of treatment by enhancing degradation occurring in soils, and not relying upon the rate of contaminant removal via extraction wells. Alternative 6 would provide an even greater degree of treatment than alternative 5 by simultaneously

effecting a greater reduction of contaminants in soils, since SVE will remove contaminants and stimulate biodegradation in the vadose zone. Alternative 7 through the use of in-situ bio-remediation would be likely to provide treatment equal to Alternative 6, depending on the enhanced rate of degradation that may be achieved in ground water. However, it is difficult to predict how well biodegradation would work due to the variability of natural conditions.

E. SHORT-TERM EFFECTIVENESS

Short-term effectiveness refers to the period of time needed to complete the remedy and to prevent adverse impacts on human health and the environment that may be posed during construction and implementation of the remedy. Since a complete health and safety plan would be completed prior to the implementation of the remedies, short-term adverse impacts during construction of the remedies would minimized. The alternatives are estimated to achieve the cleanup standards within varying time periods.

Alternatives 1 and 2 would provide the slowest anticipated cleanup because they rely on natural degradation of contamination to accomplish the cleanup. Alternative 3, which includes a soil cover, may prevent the future leaching of contaminants from soil to ground water which would achieve a slightly faster clean-up when compared with Alternative 1 and 2. Alternatives 4, 5, 6 and 7, by actively controlling migration of contaminants and restoring the ground water, would achieve the cleanup standard in the shortest period of time.

It is difficult to estimate with accuracy the degree to which natural degradation in ground water may be enhanced under Alternatives 5 and 7 (bio-degradation) to provide a faster cleanup than under Alternatives 4 and 6 (extraction and treatment). Similarly, it is difficult to predict the degree to which natural rates of degradation in the soils may be enhanced through infiltration of oxygen and nutrient enhanced water (Alternative 5) in comparison with SVE (Alternatives 6 and 7). However, SVE (Alternative 6), as a proven and reliable treatment technology, is more likely to remove contaminants from the vadose zone soil and stimulate bio-degradation resulting in a faster cleanup of soils and ultimately of ground water.

F. IMPLEMENTABILITY

Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the selected remedy. It also includes coordination of Federal, State and local governments in cleanup of the Site.

All of the alternatives are implementable. Technically and administratively, Alternatives 1 and 2 are the easiest alternatives to implement because they require little or no work. The most difficult alternatives to implement are 5 and 7 as they require significant technical oversight in the balancing of oxygen and nutrient levels to optimize the stimulation of degradation. Variables and uncertainties for Alternatives 5 and 7 could lead to delays. Alternatives 3, 4 and 6 would employ reliable technologies that are relatively easy to implement.

G. COST

This criteria examines the estimated costs for each remedial alternative. For comparison, capital costs and annual O&M costs are used to calculate a total net present worth cost for each alternative.

Alternative 1 is not discussed in detail in this section because it requires no-action and therefore no costs.

Alternative 2 would not require significant capital costs and the annual O&M costs would be limited to ground water monitoring of approximately $120,000. Alternative 2 has a total net present value of $1.5 million after 30 years of operation.

Alternative 3 has an estimated capital cost of $970,000 plus annual O&M costs to monitor ground water equal to $140,000. The total net present value for alternative 3 is $2.7 million assuming 30 years of operation.

Alternative 4 has an estimated capital cost of $550,000 plus an annual O&M cost of $240,000. The total net present value for alternative 4 is $3.5 million assuming 30 years of operation.

Alternative 5 has an estimated capital cost of $790,000 plus an annual O&M cost of $300,000. The total net present value for alternative 5 is $4.5 million assuming 30 years of operation.

Alternative 6 has an estimated capital cost of $1,075,000 plus an O&M cost of $480,000. The total net present value for alternative 6 is $7.0 million assuming 30 years of operation.

Alternative 7 has an estimated capital cost of $1,270,000 plus an annual O&M cost of $540,000. The total net present value for alternative 7 is $8.0 million assuming 30 years of operation.

H. STATE ACCEPTANCE

State acceptance indicates whether, based a State's review of the RI/FS and Proposed Plan, the state in which the Site is located agrees with the preferred alternative.

EPA has involved the Los Angeles Office of California EPA Department of Toxic Substances Control in the development of the RI/FS and the selection of the remedy. The Department of Toxic Substances Control, on behalf of the State of California, has stated a preference, and concurs with EPA, on the selection of Alternative 6 as the preferred remedy.

I. COMMUNITY ACCEPTANCE

Community acceptance indicates the public support of a given alternative.

EPA has solicited input from the community on the alternatives evaluated for the Site. The public, with the exception of one letter endorsing the no-action alternative, has supported the preferred alternative. A response to these comments is provided in Attachment B.

IX. SELECTED REMEDY

EPA has selected Alternative 6 as the remedy for the Pacific Coast Pipeline Site. The selected remedy for contaminated ground water at the Pacific Coast Pipeline Site consists of:

1) Design, construction and operation of a ground water extraction and treatment system

to treat extracted ground water to levels that meet the cleanup standards set forth in this ROD;

2) Discharge of treated ground water to the aquifer at the Site by injection or provision of the treated ground water to beneficial users of the treated ground water;

3) Soil Vapor Extraction for those areas that threaten to contaminate ground water at levels above Site cleanup standards following a one year subsurface study as described on page 23 of this ROD;

4) Ground water monitoring to demonstrate that the extraction system is effectively capturing the contaminant plume and ultimately, to demonstrate achievement of the cleanup standards throughout the aquifer; and

5) Maintenance of perimeter fencing at the Site until cleanup standards are met.

Implementation of this remedy will prevent the spread of ground water contamination and reduce the principal risk of exposure to contaminated ground water. The ground water extraction and treatment system will operate until the cleanup standards are achieved. Because this remedy will not result in hazardous substances remaining on the site above health-based levels, the five-year review will not apply to this action. The selected remedy will undergo periodic performance evaluations at a frequency to be determined in the Remedial Design Workplan.

The decision to select Alternative 6 as the remedy is based on a comparative analysis of the alternatives presented above and provides the best balance of trade-offs with respect to the nine evaluation criteria.

The ground water extraction system will operate until the cleanup standards are achieved and continuously maintained throughout the aquifer; EPA will periodically re-evaluate the remedy at a rate to be determined during the Remedial Design. It may become apparent, during implementation or operation of the ground water extraction system, that contaminant levels have ceased to decline and are remaining constant at levels higher than the cleanup standards. Based on performance data, operation of the extraction system will be adjusted as warranted if so determined by EPA during the periodic EPA evaluations.

GROUND WATER EXTRACTION AND TREATMENT SYSTEM

Ground water shall be extracted using multiple extraction wells, the exact location, number, and pumping rates shall be determined during the design of the ground water recovery system. Recovered ground water shall be treated using an onsite treatment system. Ground water shall be treated using activated carbon treatment. Final flow rates and treatment unit dimensions will be determined during the remedial design. The treated effluent shall be reused for beneficial purposes or injected back into the subsurface through injection wells constructed as a part of the remedial action.

CLEANUP STANDARDS FOR GROUNDWATER

The cleanup standards for the ground water are set forth in Table B of Section II of the Decision Summary. The selected remedy, when complete, will have reduced the concentrations of contaminants in ground water to below the cleanup standards thereby satisfying the chemical-specific ARARs (Federal

or State MCLs, whichever is more stringent and the TBCs State Action Level for toluene) for the Site. In addition, during remediation, this remedy will meet action-specific ARARs for discharging the treated water into the aquifer by injection or for providing treated water to beneficial users of the water. For any waste carbon that is generated during the ground water or soil vapor treatment by activated carbon, the applicable Resource Conservation and Recovery Act and more stringent California Hazardous Waste Control Act requirements will be met.

GROUND WATER REMEDY IMPLEMENTATION

An operation and maintenance plan for the ground water extraction and treatment system shall be required. The performance of the ground water extraction and treatment system shall be carefully monitored on a regular basis and the system may be modified, as warranted by the performance data collected during operation and at the discretion of EPA.

A long-term ground water monitoring program shall be implemented to evaluate the effectiveness of the ground water pumping and treatment system and to demonstrate achievement of cleanup standards. Additional monitoring wells shall be installed if necessary.

X. STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment as required by section 121 of CERCLA. The selected remedial action, when complete, shall comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws, unless a statutory waiver is granted. The selected remedy is cost-effective, uses permanent treatment technologies to the maximum extent practicable and includes treatment as a principal element. The following sections discuss how the selected remedy for the Pacific Coast Pipeline Site meets these statutory requirements.

PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT

Attainment of clean-up standards will assure that the levels of the contaminants of concern in the ground water at the site will not exceed health-based drinking water standards. Alternative 6 uses engineering controls in the form of a ground water extraction treatment system to remove contaminated ground water from the aquifer where it could be used for consumption. The extraction of VOC-contaminated ground water will significantly reduce the threat of exposure to residents. The implementation of this remedy will not create any short-term risks nor any negative cross-media impacts.

ATTAINMENT OF ARARS

All ARARS will be met by the selected remedy. The selected remedy will achieve compliance with chemical-specific ARARs by treating ground water to concentrations at or below the chemical-specific cleanup standards. Action-specific ARARs will be met for the selected discharge option and for the SVE system. There are no location-specific ARARs.

COST-EFFECTIVENESS

EPA believes the selected remedy is cost-effective and treats the contaminated ground water within a reasonable period of time. The selected remedy fulfills the nine criteria of the NCP and provides overall effectiveness in relation to its cost.

Alternative 6 has a capital cost of approximately $1,075,000 and an approximate annual O&M cost of $480,000. The total net present value is between $2.3 and $7.0 million depending on the time required to cleanup the Site.

USE OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner for the Pacific Coast Pipeline Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of long-term effectiveness and permanence; reduction of toxicity, mobility and volume through treatment; short-term effectiveness; implementability, and cost effectiveness. The selected remedy has also been accepted by the state and community.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

Contaminants of concern in the ground water will be extracted, and treated. The treatment will occur in the carbon adsorption treatment system to remove and concentrate the contaminants. Captured contaminants will be destroyed when the carbon is regenerated or replaced and thermally destroyed. Therefore, this remedy satisfies the statutory preference for remedies that employ treatment which permanently and significantly reduces toxicity, mobility or volume of hazardous substances as a principal element.

ATTACHMENT A

PACIFIC COAST PIPELINES
Fillmore, California
ADMINISTRATIVE RECORD INDEX

DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
00/00/00	AR 1			Newspaper article: Possible small toxic leak from old Texaco refinery poses no danger, EPA tells city
81/06/09	AR 2	R Mattson Texaco Inc	Environmental Protection Agency - Region 9	Notification of hazardous waste site w/attch site history abstract, California site evaluation sheets
84/02/00	AR 3	Radian Corp	Texaco Inc	Environmental evaluation, final rpt
85/03/01	AR 4	Linda Hogg, Dave Hartley CA Dept of Health Services	Texaco Inc	Ltr: CADOHS investigating possible hazardous waste sites, requests completion of survey form, w/o attchs, w/marginalia
85/09/23	AR 5	Raymond Delacourt CA Regional Water Quality Control Board - Los Angeles Basin Region	Lowell Craft Texaco Inc	Ltr: Concern re delay in cleanup & mitigation, request rpt re reasons for delay, new schedule
85/10/17	AR 6	Gordon Turl Texaco Inc	Raymond Delacourt CA Regional Water Quality Control Board - Los Angeles Basin Region	Ltr: Response to 9/23/85 ltr re cleanup delay
87/01/09	AR 7	Gordon Turl Texaco Inc	Raymond Delacourt CA Regional Water Quality Control Board - Los Angeles Basin Region	Ltr: Geohydrologic investigation, w/attch groundwater assessment well MW-8, 1/8/87 WK Specs for Trihydro, 2/24/87 re same, 3/2/87 backup memo
87/07/22	AR 8	Gordon Turl Texaco Inc	Athar Khan CA Regional Water Quality Control Board	Ltr: Initial information re monitoring wells w/attch well data, location map
87/10/20	AR 9	Gordon Turl Texaco Inc	R Delacourt, A Belamo CA Regional Water Quality Control Board - Los Angeles Basin Region	Ltr: Progress rpt re groundwater investigation w/o attch Trihydro rpt
87/12/18	AR 10	Henry Richter TriHydro Corp	Gordon Turl Texaco Inc	Ltr: Data re local & regional groundwater flow directions, ID water wells in facility & town areas w/attch well inventories, flow well maps
88/06/20	AR 11	Jerry Clifford Environmental Protection Agency - Region 9	Wendall Clark Texaco Inc	Ltr: EPA proposing to add Pacific Coast Pipelines to NPL list, 60-day comment period opened by Federal Register notice

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
88/06/27	AR 12	TriHydro Corp	Texaco Inc	Ground-water & soils assesment progress rpt, Texaco Fillmore Facility (draft)
89/03/17	AR 13	Glenn Anderson ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	TL: Rpts dated 12/18/87 w/o rpts, requested rpts of 12/18/87 & 1/12/89 w/o rpts
89/03/30	AR 14	Jerry Clifford Environmental Protection Agency - Region 9	Keate Worley Texaco Inc	General notice ltr w/attch mail receipt #(not given), concurrence page
89/04/18	AR 15	TriHydro Corp	Texaco Inc	2/89 Water quality monitoring results, Texaco Fillmore facility
89/04/24	AR 16	Judith Wenker Texaco Inc	William Keener Environmental Protection Agency - Region 9	Ltr: Acknowledges receipt of general notice ltr of 3/30/89
89/05/17	AR 17	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Requests rpts & other documents re site, 4/25 workplan inadequate w/attch draft SOW
89/06/09	AR 18	Gordon Turl Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Community relations effort w/overheads, rpt: Assesment of exposure & public health.., mtg materials rpt: Current... remediation project
89/06/26	AR 19	Jerry Clifford Environmental Protection Agency - Region 9	James Kinnear Texaco Inc	Ltr: Notification of special notice moratorium, criteria for good faith offer to do RI/FS w/o consent order, w/certified mail receipt #P918448216
89/06/27	AR 20	Michael Montogomery Environmental Protection Agency - Region 9	Glenn Anderson ENSR Consulting & Engineering	TL: 2/89 water quality monitoring results, Texaco Fillmore facility w/o rpt
89/08/09	AR 21	Gordon Turl Texaco Inc	Jerry Clifford Environmental Protection Agency - Region 9	Ltr: Response to 6/30/89 ltr-willing to do RI/FS, ENSR to be consultant, intent to submit good faith offer
89/09/13	AR 22	Gordon Turl Texaco Inc	Jerry Clifford Environmental Protection Agency - Region 9	Ltr: Comments on Remedial investigation/feasibility study workplan draft rpt w/o attchs
89/09/14	AR 23	Michael Montgomery Environmental Protection Agency - Region 9	Terrence Gilday Ventura County - Environmental Health Dept	Ltr: Request for meeting location for first technical steering commitee

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
89/09/21	AR 24	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Extension of moratorium, receipt of draft workplan, w/attch comments on workplan
89/09/29	AR 25	ENSR Consulting & Engineering	Texaco Inc	Remedial Investigation/Feasibility study workplan for the Texaco facility
89/10/00	AR 26	Environmental Protection Agency - Region 9		Pacific Coast Pipelines community relations plan
89/10/03	AR 27	Gordon Turl Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	TL: Manifest summaries from Fillmore remediation site manifest logs, w/o attch handwritten summaries
89/10/04	AR 28	Micheal Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Consent order can be signed, community relations plan (CRP) prepared, w/o attch CRP, fact sheet
89/10/06	AR 29	Terrence Gilday Ventura County - Environmental Health Dept	Environmental Protection Agency - Region 9	Ltr: Comments on community relations plan w/attch corrections, mailing envelope
89/10/16	AR 30	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Meeting schedules, rpts w/o PRP SAP guidance pole creek construction, ecological assesment group notes
89/11/00	AR 31	Environmental Protection Agency - Region 9		Fact sheet: EPA signs agreement with Texaco to continue investigation of contamination at former refinery
89/11/15	AR 32	Jeff Zelikson Environmental Protection Agency - Region 9	R R Dickinson Texaco Inc	Administrative consent order, docket #90-03
89/12/00	AR 33	Texaco Inc	Environmental Protection Agency - Region 9	12/89 Monthly status rpt per order #90-02 w/TL to Michael Montgomery from Gordon Turl, 1/10/90
89/12/06	AR 34	Gordon Turl Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Purpose of initial monthly status rpt per admin order #90-03 w/attch 11/89 rpt
90/01/08	AR 35	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Request Tri-Hydro docs be sent to CH2M Hill, need for permits, steering committee mtg scheduled for 3/16/90
90/01/15	AR 36	ENSR Consulting &	Texaco Inc	Remedial investigation site backround

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
		Engineering		summary draft rpt
90/01/15	AR 37	Gordon Turl Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Site backround summary rpt, facility not appropriate for NPL listing w/o rpt
90/01/30	AR 38	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Comments on draft remedial investigation site background study w/attch 1 & 2
90/02/00	AR 39	Texaco Inc	Environmental Protection Agency - Region 9	1/90 monthly status rpt per admin order #90-03 w/TL to Michael Montgomery fr Gordon Turl, 2/20/90
90/02/02	AR 40	Gregory Smith Ventura County - Environmental Health Dept	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Arrangements for next technical steering committee meeting
90/03/00	AR 41	ENSR Consulting & Engineering	Texaco Inc	Remedial investigation/site backround summary w/TL to Michael Montgomery fr Gregory Rumford, 3/2/90
90/03/00	AR 42	Texaco Inc	Environmental Protection Agency - Region 9	3/90 monthly status rpt per admin order #90-03 w/attch meeting agenda & attendees list, TL to Michael Montgomery from Gordon Turl
90/03/00	AR 43	Texaco Inc		2/90 monthly status rpt per admin order #90-03 w/attach chain of custody records & Water quality monitoring results w/TL to M Montgomery from G Turl
90/03/01	AR 44	Michael Montgomery Environmental Protection Agency - Region 9	Technical steering commitee	Memo: Next Technical steering commitee meeting scheduled for 3/16/90 w/attch commitee mailing list & meeting attendees list
90/03/23	AR 45	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Links in field activites w/attch schedule & PERT Chart
90/04/00	AR 46	Texaco Inc		4/90 monthly status rpt per admin order #90-03 w/meeting attendees revised schedule of deliveries & TL to Michael Montogomery from Gordon Turl,5/16/90
90/04/12	AR 47	CA Dept of Health	Environmental Protection	Comments to field sampling plans w/TL to

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
		Services	Agency - Region 9	Michael Montgomery from Hamid Saebfar
90/04/18	AR 48	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Comments on Draft QAPP & Field sampling plans w/8 attchs
90/04/26	AR 49	Greg Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	TL: Revised maps borehole & monitoring well locations w/marginalia w/subsurface & hydrogeologic sampling rationale w/marginalia, soil gas survey rpt
90/05/00	AR 50	Texaco Inc	Environmental Protection Agency - Region 9	5/90 monthly status rpt re admin order #90-03 w/TL to Michael Montgomery fr Gordon Turl, 6/14/90
90/05/03	AR 51	ENSR Consulting & Engineering	Environmental Protection Agency - Region 9	3/91 monthly status rpt per admin order #90-03 w/TL to Michael Montgomery fr Gregory Rumford, 5/3/90
90/05/04	AR 52	TriHydro Corp	Texaco Inc	2/90 water quality monitoring results, w/TL to Michael Montgomery fr George Hood, 5/4/90
90/06/00	AR 53	Texaco Inc		6/90 Monthly status rpt per admin order #90-03, w/TL to Michael Montgomery fr Gordon Turl, 7/2/90
90/06/08	AR 54	ENSR Consulting & Engineering		Memo: Errata sheets, pages to replace pages now in sampling plans
90/06/18	AR 55	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Preliminary comments to revised sampling plans & QAPP & project schedule revision w/attchs
90/06/28	AR 56	Glenn Mayer et al CH2M Hill	Michael Montgomery Environmental Protection Agency - Region 9	Memo: Phone conversation re ambient air sampling plan w/fax cover to Mike Montgomery fr Terry Foreman, 6/28/90
90/07/00	AR 57	ENSR Consulting & Engineering	Texaco Inc	Field sampling plan for air remedial investigation/feasibility study (RI/FS)
90/07/00	AR 58	ENSR Consulting & Engineering	Texaco Inc	Field sampling plan for subsurface soil remedial investigation/feasibility study (RI/FS)
90/07/00	AR 59	ENSR Consulting & Engineering	Texaco Inc	Field sampling plan for hydrogeologic remedial investigation/feasibility study

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
				(RI/FS)
90/07/00	AR 60	ENSR Consulting & Engineering	Texaco Inc	Field sampling plan for surface soils remedial investigation feasibility study (RI/FS)
90/07/00	AR 61	ENSR Consulting & Engineering	Texaco Inc	Field sampling plan for soil gas remedial investigation/ feasibility study (RI/FS)
90/07/00	AR 62	ENSR Consulting & Engineering	Texaco Inc	Site safety plan for remedial investigation/feasibility study (RI/FS)
90/07/00	AR 63	ENSR Consulting & Engineering	Texaco Inc	Quality assurance project plan remedial investigation/feasibility study (RI/FS) v1 of 3
90/07/00	AR 64	ENSR Consulting & Engineering	Texaco Inc	Quality assurance project plan remedial investigation/feasibility study (RI/FS) v2 of 3, appendices A-C
90/07/00	AR 65	ENSR Consulting & Engineering	Texaco Inc	Quality assurance project plan remedial investigation/feasibility study (RI/FS), v3 of 3, appendices D-H
90/07/00	AR 66	ENSR Consulting & Engineering	Environmental Protection Agency - Region 9	7/90 monthly status rpt per admin order #90-03 w/TL to Michael Montgomery from Gregory Rumford, 8/16/90
90/07/00	AR 67	Environmental Protection Agency - Region 9		Fact sheet: Texaco begins field investigation work at former Texaco refinery, (bilingual Spanish/English)
90/07/07	AR 68	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Review of field sampling & quality assurance project plan w/attch comments,FAX cover sheet to Michael Montgomery for Greg Rumford, 7/9/90
90/07/11	AR 69	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	TL: Field sampling plans for Hydrogeologic, Surface soil remediation, surface water & stream sediment, subsurface soil RI/FS w/o rpts
90/07/12	AR 70	ENSR Consulting & Engineering	Environmental Protection Agency - Region 9	6/90 monthly status rpt per admin order 90-03 w/attch ltr to Michael Montgomery fr Jorge Penalba, 7/12/90

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
90/07/12	AR 71	G Rumford, J Penalba ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	TL: FSP for soil gas RI/FS w/o rpt
90/07/20	AR 72	Michael Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Approval granted for planning documents for remedial investigation field work per consent order w/o attch
90/07/21	AR 73	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: RI errata to field sampling & QAPP plans
90/08/00	AR 74	ENSR Consulting & Engineering	Texaco Inc	Surface water & stream sediment remedial investigation rpt
90/08/00	AR 75	ENSR Consulting & Engineering	Texaco Inc	Private well investigation hydrogeological RI/FS w/FAX TL to Michael Montgomery fr Bob Tait, 8/20/90
90/08/01	AR 76	CH2M Hill	Environmental Protection Agency - Region 9	Admendment to field sampling plan for split sampling, (contract #068-W9-009, TES 12 WA #C09020) w/TL to Michael Montgomery from Terry Foreman,8/31/90
90/08/15	AR 77	Michael Montgomery Environmental Protection Agency - Region 9	Technical Steering Commitee	Memo: Scheduling of next steering commitee for 9/05/91 w/o encl monthly status rpt
90/08/15	AR 78	Everard Ashworth ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Confirms telephone conversations re air sampling program
90/08/16	AR 79	ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Revisions for QAPP, 7/90 w/QAPP signature page, Appendix F: Analytical method description
90/09/00	AR 80	ENSR Consulting & Engineering	Texaco Inc	Texaco Fillmore facility monthly status rpt
90/09/04	AR 81			List of attendees for steering committee meeting
90/09/05	AR 82			Agenda for technical steering committee meeting at Ventura county government center
90/09/07	AR 83	TriHydro Corp	Texaco Inc	Soil gas RI/FS investigation

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
90/09/07	AR 84	John Ahern TriHydro Corp	Michael Montgomery Environmental Protection Agency - Region 9	TL: Soil & gas RI/FS w/o rpt
90/10/00	AR 85	ENSR Consulting & Engineering	Texaco Inc	10/90 monthly status rpt, v1 of 2
90/10/00	AR 86	ENSR Consulting & Engineering	Texaco Inc	9/90 monthly status rpt, v2 of 2-Errata sheets for surface soils remedial investigation rpt, September 1990
90/10/01	AR 87	Marni McEntee Star Free Press	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Cleanup article focus on residents w/attch newsclip: oil waste is part of life in Fillmore, 9/10/90
90/10/24	AR 88	Janet Bergano Los Angeles Times		Newsclip: Fillmore: Wells to monitor pollution at school
90/10/29	AR 89	Hamid Saebfar CA Dept of Health Services	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Comments on air sampling program results,10/90
90/11/00	AR 90	ENSR Consulting & Engineering	Texaco Inc	RI/FS Hydrogeologic field investigation preliminary draft rpt
90/11/00	AR 91	ENSR Consulting & Engineering	Texaco Inc	10/90 monthly status rpt w/TL to Michael Montgomery fr Gregory Rumford
90/11/00	AR 92	ENSR Consulting & Engineering	Texaco Inc	10/90 monthly status rpt, attachment A
90/11/13	AR 93	Micheal Montgomery Environmental Protection Agency - Region 9	Gordon Turl Texaco Inc	Ltr: Preliminary comments on field investigation rpts w/o attch comments
90/11/21	AR 94	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Explanation of planned field work re phase 2 monitoring wells w/attchs
90/12/00	AR 95	Environmental Protection Agency - Region 9		Factsheet: Texaco to install additional wells off-site, (bilingual, Spanish/English)
90/12/06	AR 96	Gregory Smith Ventura County - Environmental Health Dept	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Technical steering committee meeting arrangements

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
90/12/17	AR 97	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	TL: 11/90 monthly status rpt per admin order #90-03 w/rpt
90/12/18	AR 98	Michael Montgomery Environmental Protection Agency - Region 9	Technical Steering Commitee	Memo: Upcoming technical steering commitee meeting, 1/23/91
90/12/27	AR 99	Michael Montgomery Environmental Protection Agency - Region 9	Jim Ross et al CA Regional Water Quality Control Board	Memo: State or local environmental protection criteria, standard of control, requirements... w/attch appendix A: ARARs & water quality goals
91/01/00	AR 100	ENSR Consulting & Engineering	Texaco Inc	Draft remedial investigation rpt, v1
91/01/00	AR 101	ENSR Consulting & Engineering	Texaco Inc	Draft remedial investigation rpt, v2
91/01/00	AR 102	ENSR Consulting & Engineering	Texaco Inc	Draft remedial investigation rpt, appendices
91/01/10	AR 103	Gregord Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Proposed restriction of analyses in phase 2 sampling
91/01/10	AR 104	Gregory Rumford ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Proposed restriction of analyses in phase 2 sampling w/FAX to Michael Montgomery fr Greg Rumford 1/10/91
91/01/11	AR 105	Michael Montgomery Environmental Protection Agency - Region 9	Glenn Anderson Texaco Inc	Ltr: Response to 1/10/91 ltr fr Greg Rumford re reduction of analysis for ground water sampling
91/01/22	AR 106	ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Data review summary of groundwater & subsurface soil investigation results w/2 TLs to Montgomery from Rumford
91/01/23	AR 107	ENSR Consulting & Engineering		Overheads for Texaco Fillmore RI/FS Technical steering committee meeting
91/03/00	AR 108	ENSR Consulting & Engineering	Texaco Inc	Final Remedial Investigation rpt, Texaco Fillmore facility
91/03/06	AR 109	Michael Montgomery Environmental Protection Agency - Region 9	Glenn Anderson Texaco Inc	Ltr: Draft comments on draft remedial investigation rpt, amended deliverables schedule w/attch comments

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
91/03/08	AR 110	Hamid Saebfar CA Dept of Health Services	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Comments on transmittal of ARARs of 12/27/90 w/attch applied action levels, title sheet
91/03/15	AR 111	Michael Montgomery Environmental Protection Agency - Region 9	Glenn Anderson Texaco Inc	Ltr: Preliminary discussion of potential contaminants and related "standards"
91/04/17	AR 112	Michael Montgomery Environmental Protection Agency - Region 9	Greg Rumford ENSR Consulting & Engineering	Ltr: Recommendation of restricted level of chemical analysis for 4/91 monitoring w/FAX TL to M Montgomery fr G Rumford, 4/17/91
91/05/00	AR 113	ENSR Consulting & Engineering	Texaco Inc	RI/FS 4/91, monthly status rpt
91/05/21	AR 114	Terrence Fox Ultramar, Inc	David Wadsworth Ventura County - Environmental Health Dept	Ltr: Comments on rpt received on 5/21/91, w/attch envelope
91/05/29	AR 115	Glenn Anderson Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Recap of 3/8/91 meeting, description of deliverables, w/attch table of contents for groundwater FS rpts w/27 maps in plastic folders
91/06/00	AR 116	ENSR Consulting & Engineering	Texaco Inc	Final remedial investigation rpt, v1, (appendix A)
91/06/00	AR 117	ENSR Consulting & Engineering	Texaco Inc	Final Remedial Investigation rpt, v 3, (appendices J)
91/06/00	AR 118	ENSR Consulting & Engineering	Texaco Inc	Final Remedial Investigation rpt, v2, (appendices B-I)
91/06/00	AR 119	ENSR Consulting & Engineering	Texaco Inc	Final remdial investigation rpt, v4, (appendices)
91/06/00	AR 120	ENSR Consulting & Engineering	Texaco Inc	Final remedial investigaton rpt, v5, (appendices)
91/06/00	AR 121	ENSR Consulting & Engineering	Texaco Inc	RI/FS May 1991 monthly status rpt
91/06/00	AR 122	ENSR Consulting & Engineering	Texaco Inc	Draft remedial alternative development & screening
91/07/24	AR 123	ENSR Consulting &	Environmental Protection	Ltr: Third quarter groundwater sampling

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
		Engineering	Agency - Region 9	w/TL to Michael Montgomery from Ellen Hedfield, 7/24/91
91/07/24	AR 124	Ellen Hedfield ENSR Consulting & Engineering	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Recommends more focused level of analysis for 8/91 quarterly monitoring w/Tl to Michael Montgomery from Ellen Hedfield, 7/24/91
91/08/00	AR 125	ENSR Consulting & Engineering	Texaco Inc	7/91 monthly status rpt
91/08/13	AR 126	CH2M Hill	Environmental Protection Agency - Region 9	Draft baseline risk assessment
91/08/27	AR 127	Michael Montgomery Environmental Protection Agency - Region 9	Technical Steering Commitee	Memo: Upcoming Technical Steering commitee meeting will be held 9/12/91
91/09/00	AR 128	ENSR Consulting & Engineering	Texaco Inc	Monthly status rpt 8/91 per admin order
91/09/12	AR 129	Environmental Protection Agency - Region 9		Agenda: Technical steering commitee meeting
91/09/12	AR 130			List of attendees at technical steering committee meeting
91/09/19	AR 131	Glenn Anderson Texaco Inc	Terrence Fox Ultramar, Inc	Ltr: Location of proposed monitoring wells in Fillmore w/attch map
91/09/20	AR 132	Hamid Saebfer CA Environmental Protection Agency - Dept of Toxic Substances Control	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Comments on draft remedial alternative development & screening rpt 6/91 & draft baseline risk assessment 8/13/91
91/10/00	AR 133	ENSR Consulting & Engineering	Texaco Inc	Aquifer testing rpt
91/10/00	AR 134	Texaco Inc	Environmental Protection Agency	10/91 monthly status rpt per admin order #90-03
91/10/02	AR 135	Mark Passarini Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Location of sampling wells w/attch well map & transmittal cover sheet to Mike Montgomery, 10/02/91
91/10/08	AR 136	David Wadsworth	Terrence Fox	Ltr: Approval of 2/15/91 proposal with

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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
		Ventura County - Environmental Health Dept	Ultramar, Inc	comments & conditions w/attch envelope
91/10/14	AR 137	Texaco Inc		Site health & safety plan, RI/FS study
91/10/15	AR 138	Hamid Saebfar CA Dept of Health Services	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Review of draft detailed analysis of remedial alternatives w/attch comments
91/10/28	AR 139	Glenn Anderson Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Comment on draft risk assessment
91/10/30	AR 140	Mark Passarini Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: Proposed fourth quarter groundwater sampling
91/11/00	AR 141	Texaco Inc	Environmental Protection Agency - Region 9	Monthly status rpt 11/91 per admin order #90-03
91/11/00	AR 142	ENSR Consulting & Engineering	Texaco Inc	Third quarter groundwater sampling rpt per admin order 90-03
91/11/11	AR 143	Michael Montgomery Environmental Protection Agency - Region 9	Glenn Anderson Texaco Inc	Ltr: Comments on detailed analysis of remedial alternatives 10/91 by EPA & CAL-EPA, RI/FS deliverables schedule w/attchs
91/11/18	AR 144	David Wadsworth Ventura County - Environmental Health Dept	Joshua Workman CA Regional Water Quality Control Board - Los Angeles Basin Region	Ltr: Lead agency transfer Beacon/Ultramar service station w/attch photocopies of business cards, site maps, mailing envelope
91/11/21	AR 145	CA Dept of Water Resources		Water well driller rpt for Ultramar
91/11/22	AR 146	CA Toxic Substances Control Div	Amancio Sycip CA Toxic Substances Control Div	Memo: Comments on evaluation of draft risk assessment for the site
91/11/22	AR 147	Glenn Anderson Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	TL: Comments on draft baseline risk assessment, 8/13/91 w/attch
91/12/00	AR 153	Texaco Inc	Environmental Protection Agency - Region 9	12/91 monthly status rpt per admin order #90-03 w/attch maps

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91/12/11	AR 148	CH2M Hill	Planning Research Corp	Final baseline risk assessment, (WA #PRC C09020, cont #68-W9-0009), w/TL to Michael Montgomery fr Terry Foreman, 12/10/91
91/12/23	AR 149	ENSR Consulting & Engineering	Texaco Inc	Feasibility study rpt, (draft)
92/01/00	AR 150	ENSR Consulting & Engineering	Texaco Inc	Feasibility study rpt revised (draft)
92/01/13	AR 151	Michael Montgomery Environmental Protection Agency - Region 9	Amancio Sycip CA Toxic Substances Control Div	Ltr: Request completion of identification of proposed state ARARs by 1/31/92, meeting for week of 2/3/92
92/01/23	AR 152	Environmental Protection Agency - Region 9		Guidance documents
92/02/00	AR 154	ENSR Consulting & Engineering	Texaco Inc	Final feasibility study (FS) rpt
92/02/00	AR 155	Environmental Protection Agency - Region 9		Fact sheet: EPA announces proposed plan for cleanup...(bilingual English-Spanish)
92/02/04	AR 156	CA Environmental Protection Agency - Dept of Toxic Substances Control	Amancio Sycip CA Environmental Protection Agency - Dept of Toxic Substances Control	Memo: Comments on feasibility study (FS)
92/02/07	AR 157	Michael Montgomery Environmental Protection Agency - Region 9	Glenn Anderson Texaco Inc	Ltr: Final comments on draft feasibility study dated January 1992, suggests conference call for 2/18/92 w/attch
92/02/11	AR 158	Mark Passarini Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	Ltr: First quarter sampling will begin 2/18/92, sampling will last 7 to 10 days, will not include semi-volatile organics
92/02/15	AR 159	Mark Passarini Texaco Inc	Michael Montgomery Environmental Protection Agency - Region 9	1/92 monthly status rpt per administrative order #90-03

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Fillmore, California
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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT

No. of Records: 159
\arfinal1.rpt

Attachment B

PACIFIC COAST PIPELINE SUPERFUND SITE
CITY OF FILLMORE, COUNTY OF VENTURA
CALIFORNIA

RESPONSIVENESS SUMMARY

A. OVERVIEW

At the time of the public comment period, EPA proposed a preferred alternative for the Pacific Coast Pipeline Superfund site in Fillmore, California. Judging from the few comments received during the public comment period, there is moderate community concern about risk from the site. EPA's clean-up remedy appears to be supported by area residents.

These sections follow:

* Background on Community Involvement;
* Summary of Comments Received during Public Comment Period and Agency Responses;
* Community Relations Activities at the Pacific Coast Pipeline site.

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Through the development of the Community Relations Plan, several groups were identified as having a high level of interest in the site. These groups included the City Council, Staff of San Cayetano Elementary School, and the parents of students attending the school. EPA provided periodic presentations on the status of site activities to these groups. In addition, Fact Sheets were sent to area residents summarizing major milestones. To summarize past community involvement, most residents seemed satisfied with the information they received about the site, and confident in the work EPA and Texaco were conducting during the Remedial Investigation/Feasibility Study (RI/FS).

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

Comments raised during the Pacific Coast Pipeline public comment period and agency responses are summarized below. The comment period was held from February 20 to March 25, 1992. All of the following were expressed in letters received by EPA during the public comment period. No comments specific to the proposed plan were made at the public meeting held on March 10, 1992.

1. The site poses insignificant risks to humans and therefore EPA should select the no action alternative; no more public or private funds should be expended on the site.

EPA Response: There is ground water contamination at the site that exceeds the State and Federal standards for drinking water and ground water in this area is used for agricultural and residential purposes. State and Federal drinking water standards are health-based standards and are used by EPA to define acceptable risk. Therefore, EPA believes the ground water contamination presents an imminent and substantial endangerment to public health and warrants remedial action. The Superfund law requires that clean-up remedies meet State and Federal standards that are applicable to the site. In this case, the drinking water standards apply to the ground water. The no-further action would not meet this requirement.

2. What impact does the site have on citrus production in the area?

EPA Response: This comment does not address the proposed remedy or other alternatives presented in the Administrative Record. However, no impacts would be anticipated based on the results of the Remedial Investigation.

3. The levels of compounds found in soil and water in and around the site are extremely low relative to other petroleum remediation sites. We believe this may be the direct result of actions taken by Texaco to remove 38,000 tons of waste material and degraded soils from the site in 1986 as well as the level of natural biodegradation which has been and continues to take place there. In preparing your comments on the Final Feasibility Study (for which we are preparing separate responses) and in your Proposed Cleanup Plan, you acknowledge that biodegradation is indeed occurring and that it should be evaluated.

Please note the relatively low benzene levels and biodegradation were not discussed at the March 10 community meeting. Also, note that Texaco conducted waste removal operations and was not under order from the California Department of Health Services. This latter point was incorrectly reported in the Site History portion of the Proposed Cleanup Plan and should have been corrected at the March 10 community meeting.

EPA Response: During the March 10, 1992 community meeting, site contaminant concentrations were referred to as representing "low levels" and biodegradation at the site was also discussed. The text of the ROD recognizes that Texaco was not under "order" but did submit documents for review to the California Department of Health Services during the excavation.

4. Using a conservative approach, EPA determined environmental and human health risks associated with the low levels of substances found in and around the site to be within the acceptable risk range

and would not have significant effects on public health. In addition, it is likely that the biodegradation observed at the site has reduced the risks from those levels reported in the risk assessment. For example, the highest benzene level recorded in site groundwater and used in the risk assessment was 720 parts per billion (ppb) in Texaco monitoring well MW-26S. Levels in that well have been over 100 times lower than that amount over the past several sampling periods and the highest levels recorded in all wells since the Second Quarter 1991 sampling have been 370 ppb in Texaco monitoring well MW-19S and 250 ppb in Ultramar monitoring well MW-9. In any event, some benzene levels found in site groundwater exceed the drinking water standards and, although not currently used as a potable water source, further cleanup of portions of the first encountered aquifer has been specified as the cleanup goal.

In general, achievement of drinking water standards as cleanup goals is a formidable undertaking given: (1) the low levels of compounds, such as benzene, at the site; (2) the complex behavior of such substances in soil and groundwater; and (3) the constraints of current remedial technology. Recent reports prepared for EPA and the Oak Ridge National Laboratory, indicate that "groundwater pumping is ineffective for restoring aquifers to health-based levels." If biodegradation is found to play a key role in reducing benzene levels at the PCPL Superfund Site, then it may be possible to achieve drinking water-based cleanup goals. If not, there needs to be flexibility in the Record of Decision (ROD) and design and implementation processes to account for the technical inability to achieve the proposed cleanup goal with current technology.

EPA Response: EPA is aware of the recent study results regarding groundwater extraction and treatment systems and has incorporated an appropriate level of flexibility into the ROD to address this issue. EPA has not determined that the risk associated with the ground water contamination at the site is acceptable. As discussed in the response to comment 1, levels of contaminants in the ground water at the site exceed state and federal drinking water standards and therefore the ground water contamination presents an imminent and substantial endangerment to public health.

5. It is difficult to achieve extremely low cleanup levels due to complex behavior of substances in soil and groundwater. Based on recent experience at similar sites, it is clear that the level of cleanup and the treatment time must be determined by performance evaluations of the groundwater remediation system. As referenced in the EPA guidance document Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites, December, 1988, performance evaluations are conducted periodically to compare actual performance to expected performance. These evaluations are part of a flexible approach to achieving remedial action objectives. Furthermore, they should be conducted periodically

during the first several years of operation depending on site-specific conditions and operational parameters. Figure 1 presents a decision tree which offers a flexible and reasonable process for assessing performance of groundwater remediation and in deciding when to terminate the remedy. We recommend that Figure 1 be incorporated into the ROD for this site.

EPA Response: EPA has established a minimum periodic review of the remedy to be conducted every 5 years. The frequency of this review may be increased if deemed necessary by EPA during the approval of the Remedial Design/Remedial Action Workplan. The decision tree recommended is flexible however it does not take into account the various modifications recommended by EPA guidance (Suggested Language for Various Ground Water Remediation Options, OSWER Directive 9283.1-03). For example, the guidance recommends that modifications should be considered for sites presenting low uncertainty that the remedy will be able to achieve the cleanup standards. These modifications include:

a) Discontinuing pumping at individual wells where clean-up goals have been met;
b) Alternate pumping at wells to eliminate stagnation points;
c) pulse pumping to allow adsorbed contaminants to partition into ground water; and
d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminated plume.

The "decision tree" proposed by the commentor does not provide contingencies but relies instead on the provision of a waiver from meeting the site cleanup standards, which is not a contingency recommended by the guidance for this type of site.

6. During the RI/FS process, water quality data indicated generally decreasing plume size (s) and limited horizontal movement for benzene in site groundwater. This may have, for the most part, been due to biodegradation. More recently, changes in the data have occurred which appear to be in response to fluctuations in groundwater levels. While these fluctuations are assessed and the rate of biodegradation is evaluated, there should be flexibility to appropriately respond to conditions encountered through the continued quarterly and specially-conducted monitoring. The remedial systems which may be installed on this site should be designed on a modular basis to provide this flexibility and should only be installed where required and warranted. We also suggest the need for some flexibility relative to the types of technology which may be applied. For example, in lieu of activated carbon for the treatment of air stripping off-gases, catalytic oxidation is included as an option in the Final FS Report and may ultimately be chosen during the design phase to treat said gases. In general, we believe the specification of particular treatment and discharge options in the ROD is unnecessary and would lead to confusion during later stages of the project. The actual choice and arrangement of process equipment should be left for the pre-

design/design phase to allow for maximum flexibility.

EPA Response: EPA will allow reasonable flexibility in the design of the remedy. However, based on the Final Feasibility Study EPA selected activated carbon. In section 3.1 of the Final Feasibility Study "thermal oxidation" was rejected on the basis of cost due to the low levels of constituents in subsurface soils. Similarly, Section 5.4.1.2 of the Final Feasibility Study states,

> "...although carbon adsorption can be expensive for removal of large concentrations of organic contaminants, the total amount of constituents to be removed at this site are low. In addition, no air emission controls or permits will be required with the carbon system. Carbon adsorption is therefore the most effective groundwater treatment technology for this site, and will be included in alternative #4."

However, in the event that a change in the treatment technology is determined to be necessary, EPA shall prepare an explanation of significant difference to the ROD to account for such changes.

7. The existence of an Underground Storage Tank (UST) problem in and around the Ultramar Inc. (formerly Conoco) service station was not included in the Proposed Cleanup Plan and was not discussed at the March 10 community meeting. The service stations is located within Action Area 2 addressed by Texaco in the Final FS Report and has affected soils and groundwater therein. A significant gasoline spill reportedly occurred at that location in 1986 and Ultramar has installed and has recently begun operating a vapor extraction system therein for the remediation of benzene and other chemicals in the soil and groundwater. The progress of Ultramar's current efforts to remediate "their site" will be an important consideration during activities leading to design of those remedial systems which may be appropriate to the PCPL Superfund Site.

EPA Response: This comment, while valid, does not bear directly upon the remedy selected by EPA or the alternatives considered for the Pacific Coast Pipeline Site. Ultramar Inc. is conducting cleanup of soils at its site under the direction of the State's leaking underground gasoline storage tank program.

8. In your Proposed Plan, you mention that a one-year soil study and soil monitoring program will be conducted to assess the rate of biodegradation. While provisions for a so-called soil study were included in the Final FS Report (in fact a one-to two-year study), it also includes provisions to evaluate the rate of degradation taking place in groundwater. We believe it is vital to evaluate groundwater degradation first. Then, after developing a strategy which specifically addresses groundwater cleanup, we would look at specific areas, if any, where soils may be contributing to significant groundwater degradation. In any event, please recognize that the studies of soil and groundwater degradation are not recommended in the Final FS Report per se; rather, action-oriented, "pre-design" evaluations of the existing database, on-

going groundwater monitoring data and specialized sampling results to determine the type, degree and location of degradational activity taking place at the site and what may be required and warranted therein to achieve cleanup and/or accelerate the cleanup process.

EPA Response: EPA's preferred alternative includes a one-year study of soil and ground water conditions prior to conducting the soil vapor extraction program.

9. Whether the EPA-Preferred Remedy (i.e. Extraction and Treatment Plus Soil Vapor Extraction/Bioventing) or an alternate remedy is chosen, we believe it is important to fully understand the issues and consequences of any action which may actually be taken at the site before embarking on detailed design activities and implementation. These issues include the effects of groundwater level fluctuations, specifics of biodegradation in soil and groundwater in the area, long-term effects of pumping, existence of the Ultramar UST problem and others. While EPA's Preferred Remedy may be prove to be an effective option, we believe the above issues are extremely important and that they should be seriously considered in the future to ensure the overall success and effectiveness of the remedial efforts at the PCPL Superfund Site.

EPA Response: The EPA selected remedy includes a one year study. Data indicate that vadose zone contamination may threaten ground water. The above issues shall be taken into account when evaluating the distribution and mass of VOCs in the vadose zone and their possible migration and mixing with groundwater.

APPENDIX B

STATEMENT OF WORK
FOR
THE REMEDIAL DESIGN AND ACTION
AT
THE PACIFIC COAST PIPELINE SITE
FILLMORE, VENTURA COUNTY, CALIFORNIA

I. PURPOSE

The purpose of this Statement of Work (SOW) is to outline the tasks required to fully implement the Record of Decision (ROD) for the Pacific Coast Pipeline Site, which was signed by the Regional Administrator on March 31, 1992. Texaco shall follow the U.S. EPA Superfund Remedial Design and Remedial Action Guidance (OSWER Directive 9355.0-04A, June 1986), the ROD, the approved Remedial Design Work Plan, the approved Work Plans to be developed as submittals under this SOW, this SOW, and any additional EPA guidance provided by EPA for designing, implementing, and submitting documents for the Remedial Design and Remedial Action at the Pacific Coast Pipeline Site.

II. DESCRIPTION OF THE REMEDIAL DESIGN AND REMEDIAL ACTION

This SOW identifies the cleanup standards and the major components of the work Texaco shall conduct to design and implement the Remedial Action for the Pacific Coast Pipeline Site. The major components of the Remedial Design and Remedial Action are as follows:

Component 1: Texaco shall design, construct, operate and monitor a ground water extraction and treatment system to treat extracted ground water to levels that meet the cleanup standards set forth in the ROD.

Component 2: Texaco shall discharge treated ground water to the aquifer at the Site by injection or will provide the treated ground water to beneficial users of the ground water.

Component 3: Texaco shall conduct ground water monitoring to demonstrate that the extraction system is effectively capturing the contaminant plume and ultimately to demonstrate achievement of the cleanup standards throughout the aquifer.

Component 4: Texaco shall maintain perimeter fencing and other site security measures.

Component 5: Texaco shall conduct pilot tests to determine the effectiveness of Soil Vapor Extraction (SVE) and to aid in determining the extent of Vadose Zone contamination.

Component 6: Texaco shall design, construct, operate and monitor a SVE System for those areas that threaten to contaminate ground water at levels above ground water cleanup standards set forth in the ROD.

Texaco shall prepare work plans and submit deliverables as specified in this SOW and in accordance with Section XII (Submissions Requiring Agency Approval) of the Consent Decree. A description of the components and required plans is provided in the following sections.

A. REMEDIAL DESIGN

1. Early Remedial Design Tasks

The following Remedial Design tasks have been initiated by Texaco pursuant to the November 15, 1989 Administrative Order on Consent for Remedial Investigation and Feasibility Study: (1) preparation of a Preliminary Remedial Design Work Plan, (2) design,

implementation, monitoring and reporting on a pilot study to determine the effectiveness of Soil Vapor Extraction, (3) design of the soil vapor extraction system, (4) design of the ground water extraction and treatment system. The approved Preliminary Remedial Design Work Plan has been summarized in the Preliminary Design Work Plan Summary which is incorporated by reference into the Consent Decree for Remedial Design and Remedial Action as Appendix C. During the implementation of Appendix C, the relative responsibilities and roles of the parties, and the resolution of any disputes between the parties, shall be controlled by the RD/RA Consent Decree as of its effective date, rather than the Administrative Order on Consent.

2. Draft Final Design and Final Design

If the design tasks set forth in the Preliminary Design Work Plan Summary have not been completed by Texaco prior to the effective date of the RD/RA Consent Decree, Texaco shall complete the design of the Remedial Action by performing the following tasks:

a. Texaco shall complete the design of the Soil Vapor Extraction system capable of remediating the vadose zone to a condition which will not cause the ground water to exceed cleanup standards described in the ROD.

b. Texaco shall complete the design of the ground water extraction and treatment system that is consistent with the ROD.

B. REMEDIAL ACTION

1. Ground Water Extraction and Treatment System

Texaco shall extract ground water using multiple extraction wells which may be constructed in a phased approach. EPA shall determine the exact location of these wells after reviewing design plans submitted by Texaco. Texaco shall treat recovered ground water using an onsite activated carbon treatment system. The treated effluent shall be used for beneficial purposes or injected into the subsurface onsite.

Texaco will monitor the performance of the treatment system and report to EPA on a regular basis. EPA may require adjustments to the treatment system as warranted by the treatment system monitoring results. Examples of adjustments that EPA may require include changes in flow and pumping rates, changes in treatment scheme, or the addition of effluent polishing procedures.

Texaco shall handle and dispose of hazardous residuals from the treatment facility in a manner that is protective of human health and the environment and in compliance with applicable federal and state regulations.

2. Soil Vapor Extraction System

Texaco shall extract contaminated soil vapor until levels of contaminants in the vadose zone are reduced to a concentration which based on modeling information demonstrates that the concentration shall not cause ground water contamination in excess of the ROD cleanup standards anywhere on-site. Texaco shall treat extracted soil vapor by vapor-phase carbon adsorption or an

equivalent treatment method. The treatment method shall meet ARARs as described in the ROD.

3. Ground Water Monitoring and Achievement of Cleanup Standards

Texaco shall monitor ground water quality and the effectiveness of the extraction system(s) on a regular basis. Based on the performance data, EPA will periodically re-evaluate the remedy.

If during implementation or operation of the ground water extraction system, performance data indicate that contaminant levels have ceased to decline and are remaining constant at levels higher than the cleanup standards, EPA will determine whether Texaco must adjust operation of the extraction system. With EPA approval, Texaco may reduce or cease pumping extraction wells in portions of the Site that have achieved the cleanup standards. EPA may also require adjustments to the monitoring system to collect appropriate data.

Following Texaco's completion of the extraction system operations, EPA will determine the duration of the compliance monitoring, based on data trends in ground water concentrations of residual contaminants. EPA, with comment by the State, shall review the need to continue the compliance monitoring requirement. If ground water compliance monitoring indicates that the concentrations of contaminants have increased above aquifer cleanup standards after cessation of pumping, Texaco shall notify EPA and reactivate the appropriate portions of the remedy.

III. CLEANUP STANDARDS

Texaco shall meet the following cleanup standards which were identified in the ROD throughout the aquifer at the Site:

A. Aquifer Cleanup Standards

Contaminant	Standard (ppb)
Benzene	1
1,2 Dichloroethane	.5
Ethylbenzene	680
Methylene Chloride	5
Toluene	100

Achievement of the cleanup standards shall be measured by the approach recommended in EPA guidance or policy. In the event no such guidance is available, achievement of the cleanup standards shall be measured using the following factors:

- an average of water quality data from wells within the former plume excluding background wells and historically non-detect wells; and
- from more than 3 quarters that include seasonal high low water elevations.

EPA may require adjustments to the monitoring system to collect the appropriate data.

IV. SCOPE OF REMEDIAL DESIGN AND REMEDIAL ACTION

Texaco shall present in the Remedial Design and Remedial Action Work Plans all procedures to be implemented to produce quality deliverables with technical accuracy.

A. Task 1: Remedial Design Deliverables

As discussed in Section II A.1 above, Texaco has submitted and is submitting the early Remedial Design reports, including submittal of Draft and Final Pilot/Phase I Design, the Draft and Final Phase II Pre-Design Reports, and the Draft and Final Phase II Design pursuant to the approved Preliminary Remedial Design Work Plan. If Texaco has not completed the design tasks prior to the effective date of the Consent Decree, Texaco shall complete the design of the Remedial Action pursuant to the Preliminary Design Work Plan Summary and the schedule set forth in Section V of this SOW.

B. Task 2: Remedial Action Work Plan

Texaco shall submit a Remedial Action Work Plan 60 days following EPA approval of the Final Phase II Design. The Work Plan shall include the following: (1) a tentative formulation of the Remedial Action Team, (2) the method for selection of a remedial action contractor, (3) a schedule for developing and submitting Remedial Action deliverables set forth in Task 3 and for completing the remedial action, (4) revised cost estimates, (5) contingency plan implementation, and (6) construction QA implementation and requirements for completion.

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Texaco shall refine the cost estimates developed in the Feasibility Study to reflect the more detailed/accurate design plans and specifications developed for each component of the Remedial Action. The cost estimates shall include capital and operation and maintenance costs (for 30 years or achievement of cleanup standards).

Texaco shall develop a Project Schedule for construction and implementation of all components of the Remedial Action. The schedule shall identify specific dates for initiation and completion of all deliverables for each component. Texaco shall identify approximate dates for completion of the project. The overall schedule should include the date of the Pre-Construction Conference and Pre-Final/Final Inspection.

EPA or its authorized representatives may perform inspections to verify compliance with the environmental requirements of each Component of the Remedial Action. Upon construction completion, Texaco shall notify EPA. EPA may require a Final Inspection which shall consist of a walk-through inspection of the site project. EPA will confirm that outstanding issues have been resolved, or identify issues still outstanding as necessary to allow completion of construction.

C. Task 3: Remedial Action Deliverables

Texaco shall also provide a schedule for and descriptions of the following deliverables in the Remedial Action Work Plan: Construction Quality Assurance (QA) Plan, Construction Quality Control (QC) Plan, Operation and Maintenance Plan, Monitoring and

Confirmation Sample Plan, Health and Safety Plan, a Closeout Report and an Extraction and Treatment System Construction Completion Report. All Remedial Action deliverables shall be submitted to EPA and the State in accordance with Section XII (Submissions Requiring Agency Approval) of the Consent Decree.

Construction QA Plan

Texaco shall include in the Construction QA plan a description of responsibilities and authorities, contractor qualifications, tests, observations, sampling and reporting requirements. Texaco shall identify and document the objectives and framework for the development of a construction quality assurance program for the components of the Remedial Action, including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling and analysis requirements; and documentation.

a. Responsibility and Authority

Texaco shall describe fully the responsibility and authority of all parties (e.g., technical consultants, construction firms, etc.) and key personnel involved in the construction of the Components of the Remedial Action. Texaco shall also identify a Construction Quality Assurance (CQA) officer.

b. Construction Quality Assurance Personnel Qualifications

Texaco shall set forth the qualifications of the CQA officer and supporting inspection personnel in the CQA plans with sufficient detail to demonstrate that they possess the

training and experience necessary to fulfill their identified responsibilities.

c. Inspections

Texaco shall summarize in the CQA plans the observations and tests that will be used to monitor the construction and/or installation of the components of the Remedial Action. The plan shall include the scope and frequency of each type of inspection.

d. Documentation

Texaco shall describe in detail in the CQA plans the reporting requirements for CQA activities. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQA plans.

Construction QC Plan

The Construction QC Plan shall include a description of the QC organization, a letter of delegation, a schedule for QC inspections, control testing procedures, submittal management and reporting.

Operation and Maintenance Plan

Texaco shall prepare an Operation and Maintenance Plan to cover implementation and long-term maintenance. The Operation and Maintenance Plan shall be composed of the following elements:

a. Description of normal operation and maintenance (O&M):

i. Description of tasks for operation.

ii. Description of tasks for maintenance.

iii. Description of prescribed treatment or operation conditions.

iv. Schedule showing frequency of each O&M task.

b. Description of potential operating problems:

i. Description and analysis of potential operation problems.

ii. Sources of information regarding problems.

iii. Common and/or anticipated remedies.

c. Description of routine monitoring and laboratory testing. Texaco must describe the laboratory tests that will be conducted on the ground water samples to test for the contaminants identified in Section III.A. For testing of sludges, treated water, filter cakes, or other concentrates prior to off-site disposition, the description of laboratory testing must include the tests required by RCRA and Title 22 and 23 of the California Administrative Code for disposal of such materials.

i. Description of monitoring tasks.

ii. Description of required laboratory tests and their interpretation.

iii. Required data collection QAPP.

iv. Monitoring frequency and date.

v. Description of triggering mechanisms, action criteria, and corrective actions to be performed.

vi. Description of criteria to be used to activate or deactivate pumping wells and for normal operations of pumping wells.

d. Description of Alternative O&M:

i. Should any operational aspect of the remedial action fail, Texaco shall state alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and the environment or exceed discharge, leachate, or performance standards.

ii. Analysis of vulnerability and additional resource requirements should a failure occur.

e. Safety Plan:

i. Description of precautions, procedures, action levels, and personnel protective equipment.

ii. Safety tasks required in event of systems failure.

f. Description of equipment

i. Equipment identification.

ii. Installation of monitoring components.

iii. Maintenance of site equipment.

iv. Replacement schedule for equipment and installed components.

v. Inventory of replacement parts.

g. Records and reporting mechanisms required:

i. Daily operations logs.

ii. Laboratory records.

iii. Records for operating costs.

iv. Mechanism for reporting emergencies.

v. Personnel and maintenance records.

vi. Monthly/annual reports to State agencies.

Monitoring/Confirmation Sampling Plan

Texaco shall develop and implement a ground water monitoring plan as a part of the Remedial Action Work Plan. The plan shall contain procedures to demonstrate compliance with the cleanup standards throughout the aquifer. EPA shall determine whether the ground water monitoring plan is acceptable.

Texaco shall perform ground water monitoring during all phases of the Remedial Action. EPA may increase monitoring frequency based upon EPA review of the data and after review and comment by the State.

The Monitoring Plan shall be developed by Texaco in accordance with EPA Region 9 requirements for sampling and analysis and quality assurance plans.

Health and Safety Plan

Texaco shall submit revisions to the Health and Safety Plans to address the activities to be performed at the facility to implement the components of the Remedial Action.

Closeout Report

All areas of pertinent operations should be described including, but not limited to; locations of clean equipment and materials staging and storage areas, the equipment and personnel decontamination areas, the water treatment facility and associated

tanks and piping, ground water and soil vapor extraction well fields, and the location of treated water disposal or discharge points and facilities.

Extraction and Treatment System Construction Report

Texaco shall submit a report to EPA documenting and certifying the completion of construction of the final extraction wells, conveyance piping and treatment system in accordance with the Remedial Action Work Plan. The report shall also contain the first three weeks of monitoring data after startup of the system's initial performance.

D. Task 4: Quarterly Reports

Texaco shall submit quarterly reports to EPA and the State, beginning 90 days from the lodging of the Consent Decree. Each Quarterly Report shall present summaries and highlights of work accomplished during the previous Quarter, all milestones met, work to be performed in the upcoming Quarter, anticipated problems and probable solutions. The Quarterly Report shall also contain copies of all data collected and produced during the previous Quarter.

V. SCHEDULE AND SUMMARY OF SUBMITTALS

Submittal	Due Date
A. Design Submittals	
Draft Pilot/ Phase I Design	May 26, 1993
Final Pilot/ Phase I Design	June 30, 1993
Draft Phase II Pre-Design Report	December 20, 1993
Final Phase II Pre-Design Report	January 28, 1994
Draft Phase II Design	March 28, 1994
Final Phase II Design	May 9, 1994

B.	<u>Remedial Action Work Plan</u> Draft Remedial Action Work Plan	60 days following EPA approval of Final Design
	Final Remedial Action Work Plan	30 days after receipt of EPA comments on Draft Work Plan
	Construction QA Plan	As specified in the Work Plan
	Construction QC Plan	"
	Operation and Maintenance Plan	"
	Monitoring and Confirmation Sampling Plan	"
	Health and Safety Plan	"
	Closeout Report	"
	Extraction and Treatment System Construction Completion Report	"
C.	Quarterly Progress Reports	Quarterly with the initial report to be submitted 90 days from the lodging of the Consent Decree

APPENDIX C

PRELIMINARY DESIGN WORKPLAN SUMMARY

INTRODUCTION AND OBJECTIVES

1. This document summarizes the Preliminary Design Work Plan (December 1992, Environmental Solutions Inc.) which provides procedures and schedules for implementing the required work identified in the U.S. Environmental Protection Agency (EPA) Scope of Work (SOW) (EPA, 1992c), the Administrative Consent Order (EPA, 1992a) and the Record of Decision (EPA, 1992b) related to soil and ground water remediation activities at the Pacific Coast Pipeline (PCPL) site in Fillmore, California. EPA and Texaco agreed to some changes that are not addressed in the structure and schedule of the Preliminary Design Work Plan. This document reflects those changes and provides the titles and schedule for the revised deliverables. It shall be noted that the overall scope of work to be performed under the work plan has remained the same as documented in the Preliminary Design Work Plan with the exception that the final design will be included as a part of the work to be performed.

2. The activities incorporated in the Work Plan address the following components of work identified in the SOW (EPA, 1992c):

- Component 1: Design implementation, monitoring and reporting on pilot/phase I studies to determine the effectiveness of soil vapor extraction (SVE) with air sparging, and SVE with ground water extraction.
- Component 2: Phase II design (100%) of a ground water cleanup system based on the results of the pilot/phase I studies.
- Component 3: Ground water monitoring and maintenance of site fencing and other security measures.

Only the first part of Component 3 (ground water monitoring), is addressed in the Work Plan. Maintenance of site fencing and other security measures are dealt with as a separate issue and are not discussed in the Work Plan.

3. The activities outlined in the Work Plan will be conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the National Contingency Plan (NCP), AOC Scope of Work (May 1992) and EPA guidance. Texaco shall perform the following tasks and subtasks:

- Task 1 - Work Plan Preparation
- Task 2 - Pilot/Phase I Design Report
- Task 3 - Pre-Design Phase II Report
- Task 4 - Draft and Final Phase II Design Report
- Task 5 - Quarterly and Annual Ground Water Monitoring
- Task 6 - Project Management and Reporting

4. The Work Plan provides the procedures for preparing a Phase I and Phase II design for the soil and ground water remediation actions. The refinement of design criteria shall be supported by a site hypothesis to be developed from additional field investigation efforts completed during the predesign activities. The procedures that will be used to refine design criteria include the following:

- Pilot-scale testing of soil and ground water remediation alternatives.
- Engineering evaluations and calculations performed as part of the predesign activities.

Texaco shall submit the following deliverables required under the Work Plan:

- A Draft and Final Pilot/Phase I Design that will provide 100% design data on the Phase I SVE, air sparging and ground water extraction and treatment systems.

- A Draft and Final Phase II Pre-Design Report containing the results of the pilot/phase I program plus conceptual Phase II design with figures and proposals with capture zone analysis and appropriate engineering calculations.

- A Draft and Final Phase II Design to include 100% design on proposed Phase II SVE, air sparging and ground water extraction and treatment systems.

- Quarterly Status Reports containing updates on progress during the quarter, sampling results, items to be submitted, description of upcoming work and any anticipated problems or changes.

5. The Work Plan also includes revisions to the ongoing quarterly ground water monitoring program. The revisions are based on the ground water characterization presented in Chapter 2.0 of the Work Plan and are necessary to eliminate sampling locations which are no longer required or that provide duplicate information. The list of constituents targeted for analysis on a quarterly basis has also been revised to focus on total petroleum hydrocarbons (TPH), benzene, toluene, xylene, and ethylbenzene (BTXE). Annual sampling and analysis is recommended for other constituents, such as the volatile and semivolatile organics which occur infrequently at much lower concentrations.

GENERAL APPROACH AND SCHEDULE OF ACTIVITIES

1. The general approach in the design activities will be to identify the need and location of soil remediation, to determine the final details of any soil treatment system that may be necessary, and to develop the type and details of the ground water

extraction and treatment system. The key elements of the approach which are contained in the Work Plan include the following:

- Initial and subsequent refinement of the site hypothesis, after collection of the additional field data and completion of the pilot/phase I testing program. This activity, which is described in Chapter 2.0 of the Work Plan, is aimed at more clearly defining potential TPH and BTXE sources; the distribution of these constituents in the vadose zone; the associated migration pathways; and the distribution of the constituents in the ground water. This information is needed to more accurately determine the additional field data needs, to plan and design a pilot-scale testing program, and to aid in the evaluation, selection, and preliminary design of the remedial alternatives.
- Evaluation and selection of an appropriate treated water disposal option required for the installation of a ground water extraction and treatment system. A temporary disposal option will be selected for the pilot/phase I testing program and included in the detailed pilot/phase I design to be submitted to EPA. The final site remediation disposal option will be selected as part of the phase II predesign activities.
- Collection and evaluation of additional field data, with emphasis on determination of the types of hydrocarbons present in the vadose zone and ground water; the depth to which hydrocarbons have affected ground water in the upper aquifer (i.e., Aquifer 1); the mobility of the hydrocarbons in the vadose zone; an improved definition of the potential sources responsible for the hydrocarbon and in the ground water, and a determination of whether these sources are significant enough to warrant remediation in light of the performance criteria and cleanup standards set forth in the ROD.
- Pilot-scale testing in the field to determine design details for required full-scale ground water pump and treatment systems, to evaluate the feasibility of air sparging concepts for ground water remediation and soil vapor extraction (SVE) for vadose zone remediation, and to evaluate the feasibility of in situ chemical treatment of ground water.
- Bench-scale testing in the laboratory to determine degradation rates in both the vadose zone and ground water. These degradation rates are particularly important, as they may help to determine the rate at which untreated portions of the site may degrade naturally and the extent to which the cleanup process in areas being remediated will be enhanced.
- Predesign activities will involve the selection and development of the final site remedial activities by integrating the results of the refined site hypothesis, the evaluation of alternative treated water disposal options, additional field data, and the results of the pilot testing program. EPA shall review the Draft Phase II PreDesign Report, which shall contain the recommended final remedy conceptual design.

- The final stage of the Work Plan is the preparation of the Phase II 100% design of the conceptual design approved in the Phase II PreDesign Report.

2. The above approach incorporates additions to, and some rearrangements of, the activities outlined in the SOW (EPA, 1992c), and includes the engineering predesign activities which EPA has requested that Texaco undertake. The proposed rearrangements include the incorporation of the EPA-required pilot study report in a predesign report. This would allow EPA to review, not only the results of the pilot-scale testing, but also the way in which these results are utilized in the design of the final site remedy.

3. The proposed schedule for completing these activities has also been modified in order to accommodate an improved sequential review process of EPA by key project milestones, i.e., the evaluation of the results of the field data collection, pilot-scale tests and the resulting predesign concepts and, finally, the design of the selected remedy. Sufficient time has also been provided to conduct a comprehensive set of pilot-scale field tests which integrate some of the key technologies being evaluated, e.g., SVE for vadose zone treatment and air sparging for the treatment of the underlying ground water.

4. The list of activities and associated schedules are shown in the attached time table (attachment #1).

DESCRIPTION OF TASKS

1. The activities to be conducted by Texaco pursuant to the Preliminary Design Work Plan include the following tasks:

- Task 1 - Work Plan Preparation
- Task 2 - Pilot/Phase I Design - These activities will include the following subtasks:
  - Development and refinement of a site hypothesis.
  - Collection of additional site information.
  - Pilot testing program.
- Task 3 - Pre-Design Phase II Report
- Task 4 - Draft and Final Phase II Design
- Task 5 - Quarterly and Annual Ground Water Monitoring
- Task 6 - Project Management and Reporting

The detailed activities associated with the above Tasks 2 through 6 are discussed in the following sections.

TASK 2 - PILOT/PHASE I DESIGN

1. This section describes each of the activities listed above.

DEVELOPMENT AND REFINEMENT OF THE SITE HYPOTHESIS

1. A preliminary site hypothesis has been developed by Texaco and is described in the Work Plan. As shown in the overall preliminary design schedule, the hypothesis will be refined after collection of the additional field data has been completed, and again when the pilot testing program has been completed. The key issues that will be refined by Texaco include the following:

- A description of the types of hydrocarbons present in the vadose zone and the ground water, including identification of naturally occurring hydrocarbons.
- An improved definition of the distribution of the TPH and BTXE compounds in the vadose zone and ground water, including identification of areas where free-phase TPH may be present.
- Approximate quantification of the mobility of TPH and benzene in key areas of the vadose zone.
- Estimation of the approximate mass of TPH and BTXE in various areas of the vadose zone and in the different ground water plumes. This information will be used to design the remedial activities in the different areas and will be useful in assuring that remedial planning remains focused on the most important areas at the site.
- Improved quantification of physical properties of the vadose and ground water zones that influence the design of the remedial alternatives, e.g., air permeability and hydraulic conductivity and the spatial variability of these parameters, the detailed layering of soil types, and the likely future fluctuations in the ground water table.

ADDITIONAL FIELD DATA

1. Additional field data will be collected to aid in refining the site hypothesis and to support the design activities. Details of the field data collection program which includes the installation of borings for geologic logging and soil sampling, and for additional monitoring wells are contained in Chapter 3.0 of the Work Plan.

PILOT TESTING PROGRAM

Introduction

1. The proposed pilot testing program includes both field and laboratory testing. The following individual field tests will be conducted by Texaco:

- A ground water extraction and treatment test to obtain information on criteria to be used to design a full-scale system, to facilitate estimation of the removal rate of benzene from ground water, and to obtain sufficient affected ground water to test different water treatment options

including carbon adsorption, air stripping, and ultrafiltration. If further evaluations warrant, fluidized bed carbon treatment may also be evaluated.

- An air sparging test using vertical wells in order to determine the effectiveness of this technology in removing benzene from the ground water, and if feasible, determine design criteria that can be used to develop a full-scale system.
- An SVE test using vertical vadose zone wells in order to evaluate the feasibility of removing BTXE and possibly the lighter hydrocarbon fractions to levels that are sufficiently low to prevent future downward migration of BTXE, particularly benzene. As part of this test, the air extracted from the vadose zone will be used to determine the efficiencies and costs of air treatment processes such as carbon adsorption, regenerative incineration, and the regenerative adsorption.
- Possibly an in situ ground water treatment test to evaluate the feasibility of injecting a compound which will not result in any environmental impacts, such as hydrogen peroxide, with ground water to provide an oxygen source for accelerating the degradation of the BTXE compounds and TPH.

2. Prior to commencing the pilot-scale tests, detailed construction plans and operating guidelines will be prepared and submitted to EPA for approval.

3. In addition to the above field tests, Texaco shall conduct laboratory-scale tests to estimate the rate of BTXE and TPH degradation that is occurring in key areas of the vadose zone and the ground water. This information will be used to aid in the selection of the final design criteria.

4. Details pertaining to each of the above tests are provided in the following sections.

Ground Water Extraction and Treatment

1. Texaco shall install, as a part of the pilot/phase I design program, an extraction well and treatment for extracted groundwater. The location of the extraction well has been changed from the location delineated in the Preliminary Design Work Plan. The revised location is in the vicinity of MW-17 and will be screened for an approximate 50-foot length in Aquifer 1. The precise depth of completion of the well will be based on analyses of saturated soil samples collected from below the water table during well boring. The screened depth will extend to at least the bottom of affected ground water.

2. Existing monitoring wells will be used to monitor upgradient conditions and downgradient conditions. The proposed layout for the test is illustrated in the Work Plan.

3. The pilot test is anticipated to be run for a period of approximately one month. During this period, flow rates will be varied between 10 and 50 gpm to observe the effects of these rates on ground water levels in the area. The pump will also be operated intermittently to determine whether this will improve the efficiency of removing BTXE and TPH. Water levels will be measured on a continuous basis using recording pressure transducers in monitoring wells. Ground water samples will be collected daily from the extraction well, weekly from the closer monitoring wells, and before and after the one-month test period from the more distant wells. These samples will be analyzed for BTXE and TPH by the method to be determined during the field data program outlined in Chapter 3.0 of the Work Plan.

4. The extracted water will be treated using portable carbon adsorption, air stripper and ultrafiltration systems and either daily or weekly samples will be collected from the treated effluent to evaluate the removal efficiencies. Fluidized bed carbon treatment will also be tested if further evaluations determine its efficiency and/or economic implications are feasible. Consideration will also be given to providing some interim onsite storage of untreated or partially treated water generated during "upsets" in the testing procedures in one of the existing onsite tanks.

5. The type of extraction pumps and the various portable treatment systems that will be considered are described in the manufacturers' literature provided in Appendix G of the Work Plan.

6. The analyses that will be conducted with the information collected from the pump test include the following:

- The ground water capture zones for different pumping rates and the time taken to achieve a pore volume displacement of water containing elevated benzene concentrations.
- The reduction in TPH and BTXE mass achieved in the general capture zone of the extraction well during the pump test period.
- The rate of TPH and BTXE removal with time.
- The potential for intermittent pumping to improve the removal efficiency of BTXE from the ground water.
- The efficiencies of the various water treatment systems tested and the associated full-scale system capital and operating costs.

7. It is not likely that the ground water extraction system pilot-scale testing would need to be expanded beyond the currently planned scope. The proposed test will provide a significant amount of information on the hydraulic characteristics of the aquifer and the potential TPH and BTXE removal rates. This data, coupled with the ground water flow modeling proposed, should provide an adequate basis for extrapolating the test results to other parts of the

site, and sufficient information to design any water extraction systems or expansions to existing systems that may be required as a part of phase II. As discussed previously, installation of these systems would be phased to allow additional data to be collected and used to refine the location and design of the final extraction wells. The extraction well will continue to operate as a part of the phase I activities after the completion of the pilot tests.

Ground Water Air Sparging and SVE

1. The testing of the air sparging and SVE technologies is discussed together as the test program has been designed to incorporate both at a single location and allows for the two technologies to interact. The SVE system is designed to remove any volatiles "stripped" from the ground water and released through the vadose zone by the air sparging system.

2. As discussed in Chapter 2.0 of the Work Plan, the proposed systems would be installed in the Pit 3 area.

3. The proposed SVE system would consist of up to four pairs of extraction or induction wells located at distances ranging from 75 to 100 feet. One well in each pair would be completed in the upper vadose zone and the other in the lower vadose zone. These wells are designed to operate both as air extraction, air induction or soil gas monitoring wells. They can therefore be used interchangeably to vary the flow conditions in the vadose zone and expand the range of conditions under which tests can be conducted for soil gas sampling and pressure monitoring, or as conduits for introducing air to the subsurface soils. One pair of wells would be located directly over the center of the air-sparging wells.

4. Three air sparging wells would be provided at approximate 50-foot centers and would be screened over a 2-foot length at approximately 20 feet below the Aquifer 1 water table. This set of wells would also be paired with an SVE well in the vadose zone. This would provide for either vapor extraction or monitoring directly above the air sparging well. The actual depths of the sparging wells would be dependent on the results of the ground water BTXE plume profiling completed during the field data collection program.

5. Provision will also be made to cover the ground surface in the area with a soil gas migration barrier such as a thin flexible membrane liner (FML) or an alternative. This liner will be used to determine what efficiency improvements in the SVE system operating in the upper vadose zone can be achieved.

6. The general method of conducting joint air-sparging/SVE tests would generally include the following sequence of events:

- Initiate and operate the SVE system in the upper vadose zone.

- Obtain initially daily, then weekly, air samples of the total extract vapor and analyze for TPH and BTXE. On several occasions, collect and analyze air samples from individual extraction wells. Additional analyses will be conducted using SCAQMD Method 25.2 to determine oxygen, CO2, methane and nitrogen levels in order to evaluate biological activity.
- Utilize the collected air to evaluate the performance and the cost effectiveness of carbon adsorption, regenerative incineration, and regenerative adsorption treatment systems. Collect daily and weekly samples of the effluent air emitted from these treatment systems.
- Continue to operate the upper zone SVE system, possibly until a steady-state removal rate is achieved. At that stage, start the operation of the lower vadose zone SVE system. Collect daily and then weekly samples of the extracted, as well as treated, air. In determining steady-state conditions, more attention will be paid to the O2 level than the TPH level which may continually decrease.
- Operate different combination of wells under a range of suctions while using some of the wells for monitoring soil vapor pressure. Use this information to determine the air flow properties of the soils, including the rate of flow through the red clay layer.
- Continue to operate both the shallow and deep vadose zone SVE systems until a steady-state removal rate is achieved. At that stage, it may be appropriate to conduct experimentation to see if further removal efficiency improvements can be achieved by using different combinations of extraction and induction wells, the addition of the surface gas migration barrier, or the intermittent operation of certain extraction wells. As discussed under the ground water extraction and treatment system test, this technique may similarly also allow for improvements in removal efficiency.
- On completion of the SVE experimentation and on reestablishment of steady-state conditions by operating either the lower vadose zone system or both systems, start the air sparging system. Monitor the extracted air from the SVE system initially on a daily, and later on a weekly, basis. Collect samples before the system is turned on, on a weekly basis, during the test and immediately after it is turned off. Use weekly or monthly samples collected from monitoring wells surrounding the air sparging system, e.g., MW-17S, -26S, -40S, and possibly -4S, to determine the rate of treatment of TPH and BTXE.

7. The SVE pilot tests will be evaluated using air samples collected on a regular basis. The air samples will be collected using Tedlar bags or canisters as appropriate. The samples will initially be profiled using the simulated distillation Method 8015m, and EPA Method 8020 for BTXE levels. After profiling, the samples will be analyzed using EPA Method 8015 for gasoline or diesel as appropriate and BTXE by Method 8020.

8. Upon completing the conventional SVE testing, a decision will be made by EPA as to whether heated SVE or bioventing should be evaluated; if appropriate, only one of them will be tested. This decision will be based on the following:

- A more detailed evaluation of the types of hydrocarbons present.
- The extent and levels of BTXE present.
- The effectiveness of conventional SVE.
- The extent of naturally occurring biologic activity in the vadose zone.

9. As indicated in the Work Plan schedule, it is anticipated that the total duration of the above testing program could take up to six months. On completion of these tests, the data would be evaluated to provide the following:

- Air permeability information which can be used to design future SVE systems.
- SVE extraction well "capture zones" and the time taken for given air flow rates to achieve a pore volume displacement in a given volume of TPH- affected soil.
- The amount of TPH and BTXE mass removed over a given period of time and an approximate comparison with the initial mass present in the area.
- The rate of TPH and BTXE removal with time and the removal efficiency improvements achievable by intermittent operation of the system.
- The efficiencies of the various air treatment systems tested and the associated full-scale system capital and operating costs.

<u>In Situ Ground Water Treatment</u>

1. After completion of the ground water pump and treat system test an in situ chemical treatment test may be conducted if approved by EPA. Based upon quantitative information on the types of hydrocarbons present, the results of the initial biodegradation studies, and consideration of ARARs, a suitable compound for in situ treatment would be selected. Candidates include hydrogen peroxide, ammonium chloride, and ammonium nitrate. The first compound provides an oxygen supply to the ground water, while the latter two provide nutrients that enhance biological activity. The use of wetting agents may be explored; these agents are used to transfer organic contaminants from the soil surface to the water phase in order to promote biological degradation in the water phase.

2. Bench scale testing may be undertaken to determine the appropriate chemical dosage rates and to ascertain whether other additives are required. For example, with the use of hydrogen

peroxides, the iron content of the water would have to be considered. Iron catalyzes the decomposition of hydrogen peroxide and would have to be removed by the addition of a phosphate additive. Organic inhibitors may also be required to control the decomposition rate of hydrogen peroxide. In the case of ammonium compounds, these tests can be used to find the optimum concentration of nutrients.

3. The following example is provided to outline how the test would be conducted with hydrogen peroxide. A mixture of diluted hydrogen peroxide (approximately 35 percent by weight) and water would be injected into MW-8S over a period of six months at a rate of approximately 5 to 25 gpm. The initial flow rate of hydrogen peroxide solution will be calculated to provide several times the stochiometric oxygen necessary to oxidize the TPH and BTXE flowing past the injection well. Variations to this rate will be made in the field based on samples collected from the closest monitoring well, MW-7S, as well as the injection well MW-8S. Consideration will also be given to operating the extraction well EW-1 during this test period to increase the rate of migration of the hydrogen peroxide in ground water. During this period, weekly or monthly water samples will be collected from the adjacent MW-7S, and EW-1 and MW-8S to determine the extent to which oxidation of hydrocarbons and BTXE compounds has been achieved.

Laboratory Scale Tests

1. Tests will be performed in the laboratory to determine the degradation rates and the effects of various factors such as oxygen and nutrients. These experiments will include monitoring the degradation of benzene and TPH in saturated zone soils. Vadose zone soils may also be tested if areas of benzene contamination in the vadose zone are identified.

2. In these studies, the saturated soil samples will be placed in 1-liter vacuum sealed chambers. Water prepared with specific dissolved oxygen levels (consistent with site conditions) will then be added to the cells. Samples will be maintained at temperatures similar to the site's subsurface temperatures. Soil and water samples will be collected from the test cells and analyzed at regular intervals. Additional samples will be tested under varying oxygen and nutrient levels to determine the optimal degradation conditions.

3. If vadose zone samples are tested, the soils will be placed in 1-liter sealed chambers, and cooled to -80° C and evacuated under vacuum to avoid volatilizing and/or oxidizing the benzene. The cell will then be restored back to ambient site temperature and filled with a specific oxygen/air mixture to simulate site conditions. Samples will be collected and analyzed at specific intervals.

4. In order to determine the extreme upper and lower limits to the rates of degradation, the saturated and vadose zone soil samples described above would be subjected to aerobic and anaerobic testing as well. Aerobic testing would be conducted by allowing the samples to be exposed to the atmosphere in the laboratory and conducting the tests in open jars. Anaerobic testing will be completed as described in the paragraphs above except that deoxygenated water or a nitrogen atmosphere will be placed in the sealed chambers.

5. It is anticipated that one to three saturated zone and one to three vadose zone samples would be subjected to the above suite of analyses.

PREDESIGN DATA EVALUATIONS

1. The evaluations to be conducted with the field laboratory and pilot test data collected have been outlined in the previous sections. The pre-design data evaluations will provide the necessary information to determine the following:

- The areas that are likely to contribute significantly to benzene concentrations in the ground water. Areas selected for soil remediation will include those that are currently contributing BTXE constituents to ground water and are expected to do so for a period significantly longer than it would take to remediate the ground water affected by the soil area.
- The SVE well types and spacings needed for soil remediation.
- The areas of ground water that require active remediation.
- The possible occurrence of natural degradation which may be considered in the development of the Design Criteria used to establish target volumes for ground water remediation.
- Ground water pumping rates and cyclic pumping operations that more efficiently remove benzene from the ground water.
- The types of water and air treatment systems that are best suited to the site conditions.

2. Preliminary ground water modeling will also be completed as part of the predesign evaluations. A two-dimensional computer code such as SUTRA or MODFLOW will be utilized to model the flow in Aquifer 1, and will be used to determine well capture zones and pore volume displacement times. This information will be used to more accurately locate the wells, to evaluate capture zones under a range of future water level conditions, and to select optimum pumping rates. The models will be used to evaluate flow directions and potential changes in flow direction to the south of the site. It will also be used to evaluate the overall water balance of Aquifer 1 and the potential future local and regional drawdown rates caused by pumping the extraction wells.

3. Vadose zone migration analyses will also be completed. These

will include the following basic steps:

- Identification of areas in the vadose zone where TPH and benzene migration analyses are to be conducted. These will include areas where significant leachable benzene concentrations are found to be present.
- Determination of the geologic "flow paths" in the areas selected above. These flow paths would take into account the effect of the lower conductivity clay or silt layers present and consider the potential vertical and horizontal migration pathways.
- Use of analytical unsaturated flow techniques in addition to available vadose zone chemical constituent migration computer models such as "VLEACH" and/or "SESOIL" to determine likely benzene migration rates and associated loads to ground water. The migration mechanisms incorporated in these models, as well as their data requirements are summarized in Table 4.1 of the Work Plan. While VLEACH is the model typically used by EPA, SESOIL has been included as it allows for the evaluation of degradation of key constituents. The analytical unsaturated flow techniques are included to provide an independent assessment of moisture migration through the vadose zone, as a "realism" check to the constituent migration modeling.

4. An evaluation of full-scale treated water disposal options will also be completed, and the most suitable alternative selected. The evaluation will include technical and economic feasibility, permitting requirements, potential health or environmental risks, the likely impact on the local ground water levels and flows, and the likely impact on surface water flows. The amount of water to be pumped from the PCPL site is relatively small, and, therefore, disposal options should not represent a significant cost. However, because of the cost of installing reinjection wells, the potential technical complications associated with long-term operations, and maintenance and monitoring requirements of the wells, it is anticipated that reuse would be substantially more viable. The following disposal alternatives would be evaluated recognizing the preference for beneficial reuse stated in the ROD:

- Reinjection of treated water using either wells, or surface infiltration basins or trenches.
- Reuse of treated water for agricultural purposes (e.g., irrigation).
- Discharge of treated water to a publicly owned treatment works (POTW).
- Discharge of treated water to a surface water body.

5. The potential impact on local ground water conditions may become an important issue if a relatively large total extraction rate is required. Should the resultant impact of this extraction be judged to be excessive, consideration may need to be given to

reinjecting at least some of the treated extracted water. If required by EPA, the design of reinjection wells will be based on the performance results obtained from other projects, as well as ground water modeling. Evaluation of the potential for buildup of chemical or biological deposits will be accomplished using available published information or, if necessary, by conducting jar tests in the laboratory. Plans for conducting any testing would be submitted in a technical memorandum to EPA for prior approval.

6. In summary, the important types of information that will be obtained from the proposed field and pilot-scale testing programs include the following:

- **Treatment System Testing:** Data on influent and effluent (air and water) concentrations. Equipment and reagent/materials costs will be used to evaluate the proposed treatment system with other systems that meet the required effluent standards.
- **Extraction Well Testing:** Pumping rates and well water level response data will be used to calculate conductivity and storage characteristics of the aquifers. Field geologic data and computer modeling will be used to extrapolate this data to the full-scale design conditions, in order to determine associated vertical and horizontal capture zones. Mass of hydrocarbons removed and the time variability of this removal rate will be used in conjunction with the computer modeling to determine full-scale removal rates and the associated decline with time. This information will be used to design a system that maximizes hydrocarbon removal.
- **Air Sparging Testing:** This type of testing determines the approximate removal rate of hydrocarbons that can be achieved, as well as the approximate volume of ground water that can be treated by an air sparging well.
- **SVE Testing:** Conventional SVE testing data (i.e., air flows, soil gas pressures, and extracted air, TPH, BTXE, and biodegradable product analysis) will be used to determine the design parameters for any full-scale SVE remediation.
- **Field Soils Data:** The forensic analysis will be utilized to determine the types of hydrocarbons present and, hence, their potential mobility and susceptibility to SVE remediation. The soil property analyses will be used in the constituent migration analyses or modeling to determine the approximate vertical migration rates and, consequently, the ground water impact potential.

REMEDIAL DESIGN CRITERIA AND CONCEPTUAL DESIGN

1. The final Design Criteria and a Conceptual Design will be developed based on the refined site hypothesis, as well as the results of the pilot testing programs. The refined site hypothesis will be used to determine areas of the vadose zone that may require treatment, and target volumes for ground water cleanup. The potential criteria for determining whether the vadose zone requires

treatment include:

- The likely duration of the vadose zone benzene source to ground water.
- The relative advantages and disadvantages of treating the vadose zone soils and the ground water, only the ground water, or only the vadose zone soils.
- The uncertainty associated with the projections of cleanup times, both under natural degradation conditions and as influenced by physical remedial actions.

2. In evaluating the above factors, the following criteria will be considered:

- The cleanup standards in the ROD.
- Soil and water quality data.
- The rate of cleanup and natural degradation projected for the remedial measures being considered.

3. Once the specific areas requiring remediation are determined, conceptual designs will include: (1) a description of the location, depth, spacing and completion details of the required vadose zone and ground water wells; (2) the targeted number of ground water pore volume displacements; (3) a general description of any surface treatment, such as soil gas migration barriers for the SVE systems; (4) the location of surface pipelines; (5) the selection of water and air treatment systems; (6) the location of these treatment systems; and, (7) the location and destination of the treated water effluent pipeline. Sizing of air and water extraction systems, and air and water treatment systems, as well as selection of the appropriate operating periods, will be based on the goal of achieving an appropriate balance between capital costs on the one hand and operating and maintenance costs on the other. Preliminary capital and operating costs will also be developed.

TASK 3 - PREDESIGN REPORT

1. A predesign report will be prepared for EPA's review. It will incorporate a detailed description of the following activities, results, evaluations and designs:

- A description of all the field activities conducted, including a presentation of the borehole logs, the well completion details and the analytical data.
- The results of the lab tests conducted to characterize the conditions in the vadose zone, including the chemical and physical testing.
- A description, and as-built sketches, of the completed pilot/phase I testing programs, including copies of the data collected during these tests.
- Evaluations of the field and the pilot testing program data.

- A description of the rationale for selecting the final remedial components, the vadose zone and ground water areas to be remediated.
- A description of the preliminary ground water modeling and the vadose zone migration evaluation results.
- A description of the engineering measures that would be installed as part of the final (phase II) site remedy.
- Estimation of potential ranges of remediation periods.
- Capital and operating costs associated with the final site remedy.
- A series of figures illustrating the selected final site remedy.

TASK 4 - PHASE II DESIGN

1. This activity will involve the preparation of a phase II draft and final (100%) design for the remedial measures approved by EPA in the predesign process. It is anticipated that it will incorporate the following items:

- A description of the aquifer and/or vadose zone modeling results used to determine the appropriate well locations, screened intervals, and pumping and/or vacuum extraction rates.
- Final plans, drawings and sketches, including a site plan showing the location for each well, treatment system, pipeline and disposal point.
- The design criteria to be utilized for specifying the type and sizing of treatment systems, and the type and size of components anticipated.
- Design details for wells and pipelines.
- A construction schedule, including a description of the strategy which will be used to assure that each key activity is accomplished with acceptable quality and promptness.
- The status of access agreements and permits, as well as contingency plans for modifying the design configurations if key agreements cannot be achieved in time.

TASK 5 QUARTERLY AND ANNUAL GROUND WATER MONITORING

1. Texaco has been collecting quarterly ground water samples onsite since 1990. The analytical results of these samples have been submitted to EPA in the form of quarterly monitoring reports. This additional data and the site hypothesis described in Chapter 2.0 indicate that revisions to the program could aid in streamlining the collection and analysis of water samples, while still providing the data necessary to characterize ground water quality on an ongoing basis.

TASK 6 - PROJECT MANAGEMENT AND REPORTING

1. The work described in this report will be managed by Texaco Environmental Services and Environmental Solutions, Inc., the selected contractor. More details on the project team, how the project will be managed and what reports will be prepared are contained in Chapter 5.0 of the Work Plan.

PROPOSED SCHEDULE OF ACTIVITIES

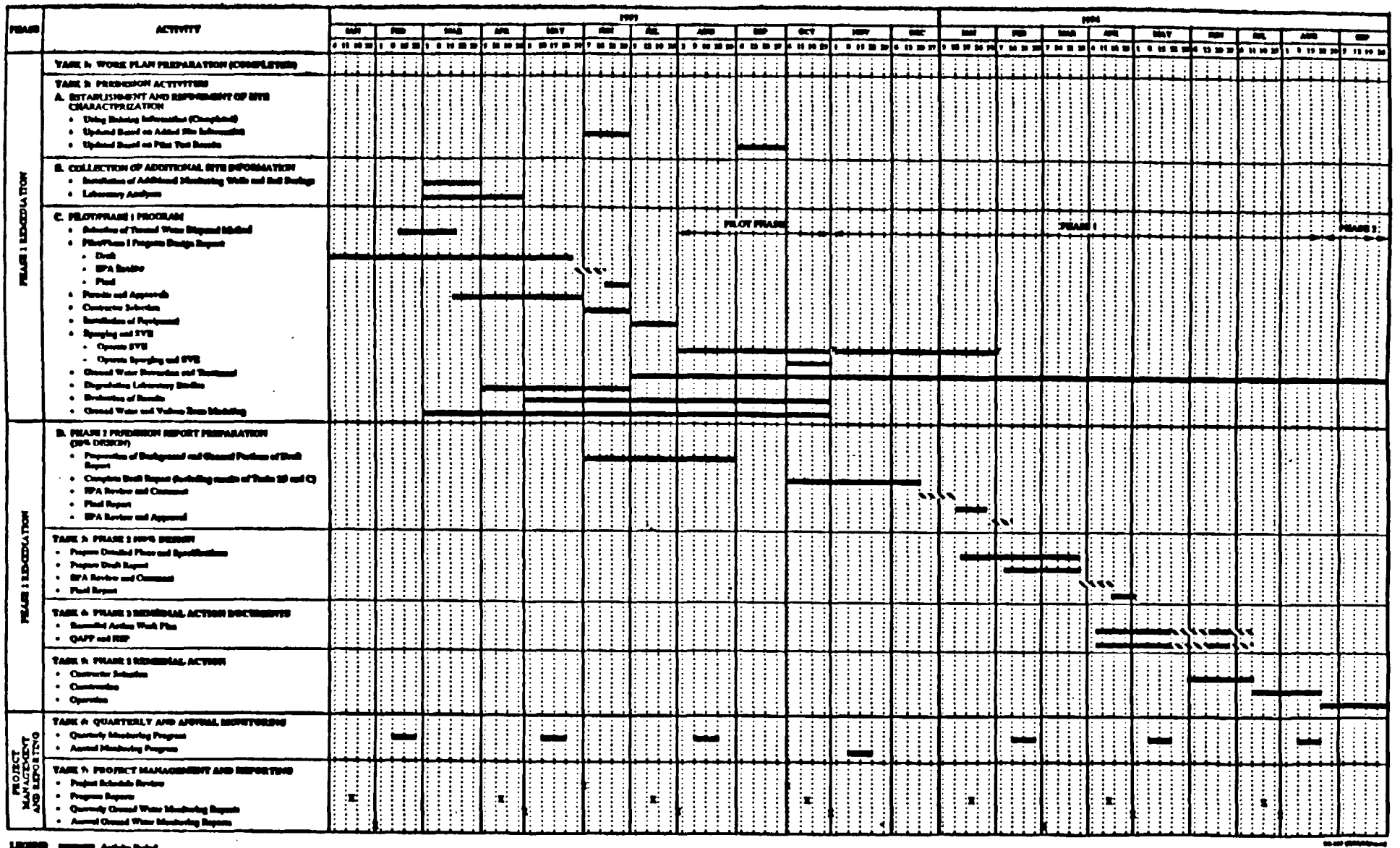
1. The schedule for the proposed activities is provided in Attachment #1. It has been developed to provide a logical sequence of evaluation of disposal alternatives, collection of additional field data, conducting of the pilot-scale testing, predesign evaluations, and preparation of the final design. Appropriate EPA reviews of key project documents are also incorporated.

2. At EPA's request, the shortest practicable schedule has been presented. It allows overlap between the completion of the pilot-scale testing data, the preparation of the Predesign Report and the Phase II Design Report. This can be accomplished provided the pilot-scale tests proceed rapidly and effective full-scale remedies can be selected based on early testing results. The results of the later testing can be evaluated and incorporated to refine the preliminary design. However, should complications arise, and should more testing be required to develop the full-scale design, the schedule may have to be extended.

3. The key elements of the proposed schedule include:

- An early completion of the additional field data collection to provide input to the design of the pilot testing program.
- Preparation of detailed designs and operating plans of the pilot testing program for EPA comment.
- A reasonable period of time, i.e., eight months, to install and operate the various elements of the pilot-scale testing program. Even with the time allocation, there may be a need to extend certain aspects of the program. If this is necessary, discussions would be held with the EPA to determine an appropriate revised schedule.

REVISED DESIGN SCHEDULE (FEBRUARY 1993)
PCPL SITE



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